Australian Model Engineering

January-February
1995

Issue 58

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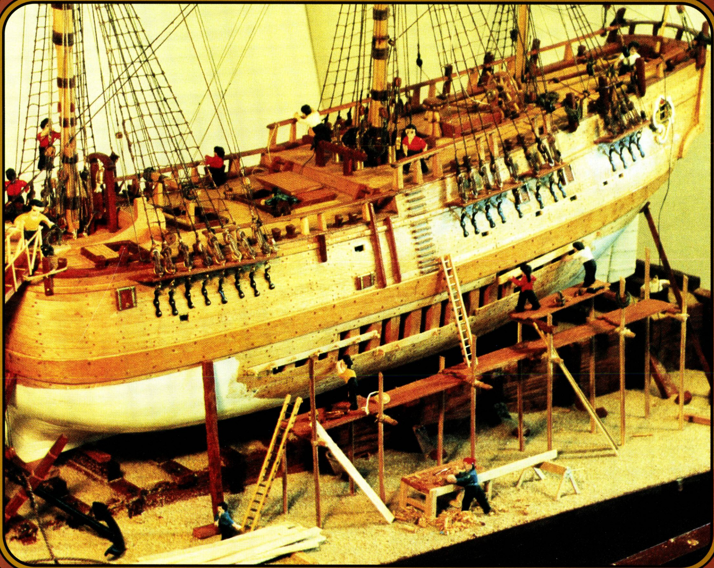

LOCOMOTIVES, TRACTION & STATIONARY ENGINES, BOATS, WORKSHOP, PRODUCTS, CLUB NEWS & EVENTS, REVIEWS

In This Issue:
- ☑ H M Bark Endeavour, Model & Replica
- ☑ Build a Small Drill Sharpening Jig
- ☑ Outdoor Garden Railways

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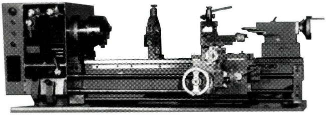

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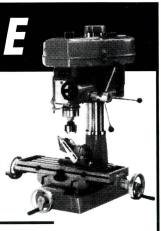

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IN-DEPTH SECTIONS ON:

- Taper turning (3 different approaches)
- Hand stoning chambering and other reamers (You simply will not get this info elsewhere!!)
- Some more info on case hardening, and on sharpening fine edged tools. (These are real "frosting-on- the-cake" items that follow on from info in TMBR#2.)

PLUS:

- How to make working miniature spar tree blocks ("Loggers' jewelry"), and some notes on making wire-bending jigs.
- How to do a deluxe overhaul on a keyless drill chuck.

And that's only a start... there's more, including several ideas on how to make money in your shop, or just plain have fun and make good tools and accessories:

- Good tips on dialling in the head of a milling machine and how to keep from getting maimed or killed while doing it.
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- An aid to setting up work on a faceplate
- A simple collet chuck system for your lathe
- A miniature 4-jaw chuck for small work
- Making and using firm joint calipers
- Making special taps
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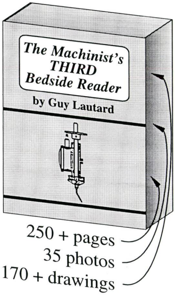
- Fit a backplate to a lathe chuck
- Get broken taps out of aluminium
- Improve your magnetic indicator base
- File off that last half thou
- Sharpen very small drills
- Do some very fine silver soldering

PLUS:

- Info on a hand-powered drill that will drill through 2" plate glass, truck frames, HSS end mills, etc.
- A few anecdotes, including a machinist's "Coincidence Maximus" - you'll have to read it to believe it!!



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Please have your space for

March-April 1995

issue booked by:

Friday 20 January 1995

January-February 1995 Issue 58

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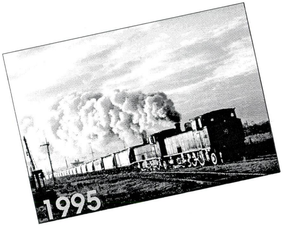
The Cover

This 1/60 scale model came about when Ron Lucas found the construction of a steam locomotive becoming a little tedious. To give you an idea of the scope of this project, the specifications are: length 750mm, width 200mm and a height of 750mm.
His story begins on page 9. Photo: R. Lucas



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Highlights of the NSW STEAM CALENDAR include:
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Highlights of the Australia-wide DIESEL CALENDAR include:
The now retired Southern Aurora with double 421 class at the head end; AN 870 class at work on the Eyre peninsula; Westrails AA hauling ballast under a clear sky; VRs S class on a Simboola passenger; QR 1502 class on a block wheat train; Double 422 class on the short south of NSW; AN 600s on a mixed goods; VR X35 on a "Jet" to Adelaide; Double SAR 900n class leaving Peterborough with a goods.

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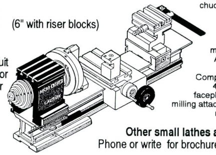

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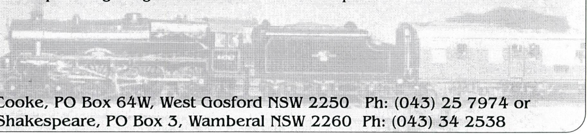

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Managing Editor
Brian Carter .... (02) 649-5301
Bus. Hrs. 018 022209
Fax (24 hrs)...... (02) 646-1362

Contributing Editors
Leigh Adams, Melanie Dennis, Neil Graham, Dave Harper, Clive Huggan

Assistant Editing
Tony di Salvo, Murdoch Finlay, Alan Holswich, Trevor Jones, John Oliver, Kris Siderov, Paul Trevaskis

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Contributors
Roger Anderson, David Burke, Mark Carney, Melanie Dennis, Drew Diamond, Ross Edmondson, Barry Glover, Ron Lucas, Murray Mitchell, Gerardus Mol, Les Payne, John Riters, James Squirell, John Wood.

Subscriptions & Back Issues
Robert Fox .... (042) 56-5013

Publication Manager
Neil Graham............... (048) 85-1179

Area Representatives
Western Australia
Doug Baker................ (09) 341-1630
Keith Watson .... (09) 457-2008

South Australia
Andrew Matthews ..... (08) 384-5726

Victoria
Bill Belton .... (054) 28-7015
Bill Taylor .... (03) 458-3404

Tasmania
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ACT
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New South Wales
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Queensland
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New Zealand
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Comment

In the Public Eye

Every weekend throughout Australia there is a public running day at one live steam club or another, where the local members of that society gather to run miniature steam train rides for the public.

Have you ever stopped to think that not only do the public pay to ride on these miniature trains (and no doubt have an enjoyable day out at the same time), but during the course of the day, they also look at *you,* the train driver, guard, station master or whatever particular duty you hold on the day.

Lets have a look at what the public too often see

Starting at the top, there he is with his cap on, surrounded with badges of clubs he has visited over the years accompanied with much dust, dirt and grime to justify the many miles of travelling. Of course this is seen by some to be a status symbol, but what do the majority of the public think? And then there's the face! What an add for the 'five o'clock shadow' and the excuse, "I'll have a shave before I go out tonight"—and then there's the overalls—Struth! I know times are tough and the country is drought ravaged, but you still only have to turn the tap on to get water, as for *Rinso*, I'm quite sure some of us think it is the name of a racehorse! Finally the eyes drop to the boots, well, nobody puts polish on boots these days, or do they? I shudder to think of the impression left on the public by now.

So what's all this leading to?

Simple: you spend many years constructing a locomotive to take out on running day, and on the day it sparkles. The rods are all nice and shiny, the dome is immaculate and you've just spent a couple of hours cleaning it to perfection. You even spend more time on this than the family car. This is acceptable I suppose. But, did you look at yourself in the mirror before heading off down the track?

When it's all said and done, it doesn't take much effort to put on a clean pair of pants and shirt which have been ironed. Some societies have T-shirts with the club logo emblazoned thereon. These are okay, but one should have the appropriate physique to go with them. I know of two societies (Blue Mountains Railway Society and the Tullamarine Live Steam Society), whose members wear a uniform in the form of overalls. Irrespective of what anyone thinks, at least they look neat and tidy!

No doubt, this missive may touch a few raw nerves within the ranks, but my final words are: "If the cap fits—wear it!"

Ross Edmondson

To our new reader

If this is your first issue of Australian Model Engineering, welcome!

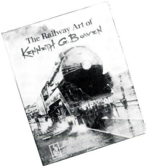
We hope you'll look forward to the ideas, news and camaraderie in each bi-monthly issue. One of the great things about our hobby is the way model engineers actively help each other. Unless you live in an isolated community, you'll soon discover who has valuable experience in your field of interest, or who will help you to make a part that's too big for your workshop machinery. Look in the *Club Roundup* section to find a club that's near to you; visit the club and you'll usually find model engineers who live not too far away. Then you can experience the fellowship for yourself.

This magazine is prepared in the same spirit of "model engineers helping each other". About two dozen people put many hundreds of hours work into each issue—all on a voluntary basis—to help model engineers in Australasia keep up to date and keep in touch. We rely on our readers to write articles for us—for the same (non-existent) rate of pay! If you have ideas or techniques that you feel would be interesting to others, please drop us a line.

We'll gladly help with preparation of artwork or editing if that's necessary.

Brian Carter

GREAT READING!



The Railway Art of **Kenneth G Bowen**

130 pages, 290 x 230mm mostly full colour, some B&W sketches.

From the days of steam in N.S.W., presented here are reproductions of Ken's famous paintings covering the period 1930's to the early 1970's. Accompanying each painting is a short description to set the scene of what the artist has captured with the brush. From 0-6-0 shunters to the massive 60 class garratts, ranging from city to far country locations

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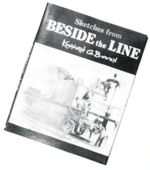

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BYWAYS OF STEAM — 4

132 pages, 250 x 180mm, many illustrations and B&W photos

Features NSW South Coast in Steam, centred around Thirroul, Wollongong to Moss Vale; Beecroft Bank workings with 35 class highlighted; Life of an engineman Part 4 — Bruce Griffey concludes his interesting story with many anecdotes; South Maitland Railways circa 1930 .

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AUSTRALIAN DIESEL SCENE

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Features:- Life and times of the 47 class; Early Diesel Days on the North Coast of NSW — many photos of the now extinct 40 class; The Ulan line — the missing link from the ill fated 1911 Sandy Hollow - Maryvale line; Tea & Sugar, AN's supply train across the Nullabor; Unusual Spring workings in NSW.

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BYWAYS OF STEAM — 6

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This is the latest book in the byways series and introduces new historical material & subject matter. Features:- Wal Jenkins the ASM — learning the job; The Death of HJ Heffernan — the introduction of respirators and the areas they were used; Workings at Sydney station — Fred Saxon takes the reader back to his early days on the railways. This started in the Blue Mountains , he then covers workings at Sydney Central which in those days was all steam; Byways of Steam — 6 also looks at two of our Rail Heritages, namely Arncliffe Cutting and Knapsack; A brief coverage of Carcour, on the Harden - Blayney cross country line, this essay is illustrated with diagrams and photographs.

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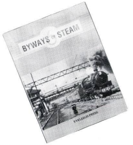

BYWAYS OF STEAM — 5

120 pages, 250 x 180mm, B&W photos

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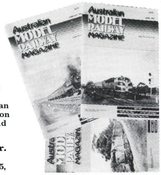

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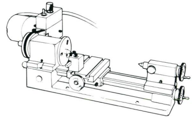

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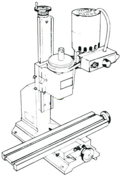

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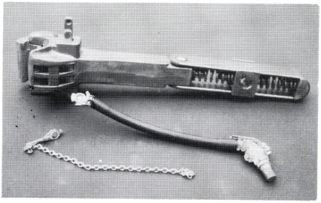

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His Majesty's Bark Endeavour

Model story and photos by Ron Lucas

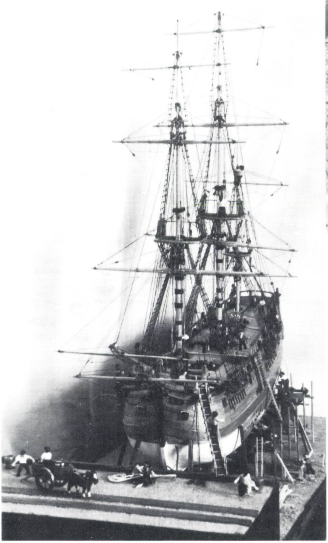
The full-size replica *Endeavour* is on the water—and visiting many ports around Australia. To help celebrate this great achievement from Western Australia we are presenting another great achievement, this time a fine *Endeavour* model from mid-northern NSW.

The building of this 1/60 scale model came about when I found the construction of a steam locomotive became a little tedious. With the thought that a change would be as good as a rest, I obtained a set of Harold Underhill's plans for the *Endeavour*. As it was intended that this model be scratch built, after studying the plans and still wishing to do everything correctly, I realised I needed help. Two books, both written by Harold Underhill: *Plank on Frame Models*, Vol 1 and Vol 2, proved to be valuable. To give you an idea of the scope of this project, the model specifications are: length 750mm, width 200mm and a height of 750mm.

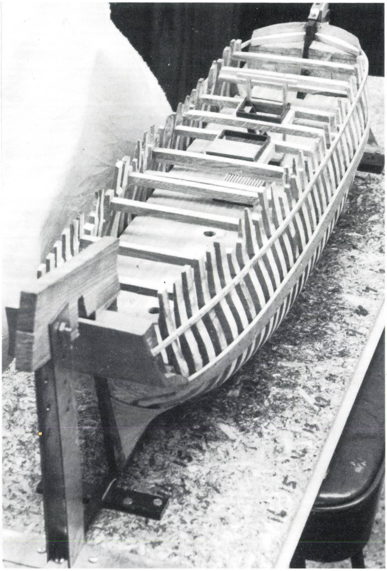
In the beginning

A word to beginners: if you wish to enjoy model ship building, buy a kit for your first project. If you enjoy pain and suffering — scratch build!

Building took place over a period of 18 months, but actual time would be approximately six months full time. The timber selected for 90 per cent of the work was jacaranda — a tree from a neighbour's backyard. Make sure it's well seasoned before using. Frames for the hull were drawn up, then constructed as in full size, using wooden nails (trenails). All planking was fastened with wooden nails, bamboo being ideal for this job. Bamboo skewers from K-mart are a good source of material; bamboo blinds provided mine. To make them, split the bamboo into strips as thin as possible with a craft knife, then drill holes in a strip of thin mild steel (1/16" - 2mm) starting at say 3/32" and reducing hole size progressively to 1/64". Pull the bamboo strips through each hole to reduce their size and make them round.



A full view of Ron's Endeavour diorama.



Frames for the hull were drawn up, then constructed as in full size, using wooden nails (trenails).

Assembly

With the planking held in position, suitable size holes are drilled, then nails glued and driven in. To do the planking correctly, as explained in Underhill's book, a proportional divider will be required. I took one look at the price, then made my own from an old steel rule. Nothing flash, but it worked. To glue the planking on to the frames, contact adhesive is better than PVA, it holds in place better while nailing, however, PVA is better for fitting nails.

For cutting the planks 1.5mm thick (scale 4"), a small 100mm diameter circular saw bench was made, the saw having very fine teeth. If you decide to fit planks that are the full length of the ship, make sure that it has dummy joins at every scale 15-20 feet as planks of that era could seldom be cut longer. All masts and yards are made from jacaranda, with the exception of the top yards which are from shaped bamboo skewers, jacaranda being too weak in this size.

Rigging

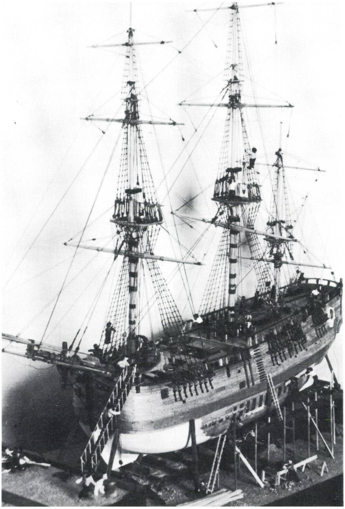
When fitting blocks such as deadeyes to the rigging, rather than trying to tie knots it is easier to place the line around the block, twisting the end around the main line and securing with a dab of instant glue (Superglue). This glue can be used in many places, particularly in rigging. One difficulty is threading lines through small holes: a needle is often too big, so the answer is to make the line into a needle by shaping it to a point with superglue, but remember to wet your fingers first! Fitting blocks to yards with twine is very difficult, but by using fine wire and painting black, it is hard to distinguish the difference. All wooden blocks I used on the *Endeavour* were cut from school rulers. Usually they are made from good quality boxwood, but check them, as some brands are of very poor quality.

If small drills are a problem, try Dick Smith's: they have a set of four in a packet, that are small enough to meet all requirements and while you're there buy yourself a pin-drill.

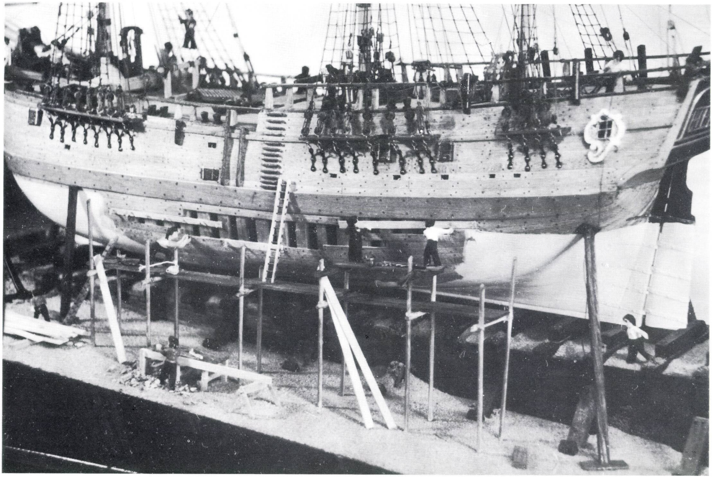
Twine used in the rigging is good quality linen thread. Do not use cotton as it does go slack under certain weather conditions.

The foregoing has been written in the hope that it may help someone to get started. Modelling doesn't have to be expensive when scratch building, but it certainly exercises the brain, finding ways to do things. The books I recommended were the biggest expense, but they are really an investment as they are yours for life, and will be useful for reference during the building of any other ship models.

That's all for now, so back to my steam locomotive!



Ship building techniques of the past are a far cry from the methods employed today! Compare these scenes with the photos of construction of the full-size replica Endeavour on pages 12 and 13.



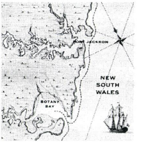
HM Bark Endeavour—1768

Originally the Whitby-built collier *Earl of Pembroke*, the *Endeavour* was brought into the Royal Navy in 1768 and fitted out at Deptford in 1768 for Captain Cook's first voyage to the Pacific. After her return in 1771 she made several voyages to the Falkland Islands carrying stores. It is said she then returned to the North Sea coal trade, before being sold to the French, finally ending her days at Newport, Rhode Island, towards the end of the 18th century.

In March 1768, the Navy Board recommended to the Lords Commissioners of the Admiralty to make choice of a cat-built vessel for the voyage to the Pacific. The colliers from the Whitby shipyards possessed the qualities required in a ship employed on discovery: shallow draught, sufficient capacity to carry stores for a long voyage, and of a construction and size which may be safely laid on shore. The vessel, was 106 feet long overall and 29 feet 3 inches in breadth and displaces 368 tons. An extra sheathing of plank, filled with large flat headed nails, was given to the vessel for protection against worms.

Endeavour's complement

For the first voyage to the Pacific, *Endeavour*'s complement consisted of captain, second lieutenant, master, two master's mates, boatswain, two boatswain's mates, gunner, carpenter and mate, surgeon and mate, three midshipmen, a clerk or steward, two quartermasters, armourer, sailmaker, eight servants, 41 able seamen and twelve marines. Also on board were a group of scientists and their servants. They were Mr Joseph Banks, Fellow of the Royal Society who partly financed the expedition; Dr Solander, botanist; Alexander Buchan, artist; Sydney Parkinson, artist and draftsman; and Charles Green, astronomer. The scientists accompanied the journey to observe, from Tahiti, a rare solar transit of Venus.



The journey

Endeavour was exactly the kind of vessel Cook felt at home in: a fat, ugly, sturdy collier, seasoned by almost four years of grimy service on the North Sea coal route. Cook personally supervised much of the necessary work of the conversion. On the afternoon of 25 August 1768, Cook gave the order to sail. The *Endeavour*'s stubby nose pushed across Plymouth sound and out into the English Channel and the Atlantic Ocean. Eleven months later, the observation of Venus was completed, and Cook's secret instructions commanded him to put to sea again "without loss of time" to find the Southern Continent. He weighed anchor on 13 July 1769. For almost a month, the *Endeavour* glided through an enchanting archipelago that Cook named the Society Islands. After 9 August there were no more islands to be seen. As *Endeavour* ploughed on south, the weather began to chill. The 40th parallel was crossed early in September. Cook was becoming convinced that they would not reach land when, after another month, the expedition reached New Zealand. After circumnavigating and mapping the islands, the Endeavour and crew set sail toward the Cape of Good Hope on 31 March 1770. So far, the fulfillment of his secret instructions had been largely negative. "As to a Southern Continent," he wrote, "I do not believe any such thing exists, unless in a high latitude." After 19 days of sweeping across the Tasman Sea, a dark blur was seen on the rainy horizon—Cape Everand, near the south-eastern extremity of Australia. On 28 April 1770, *Endeavour* anchored in a bay Cook called Sting Ray Harbour. Later, he changed the name to Botany Bay. And the rest is, as they say, history.

James Cook, 1728-1779

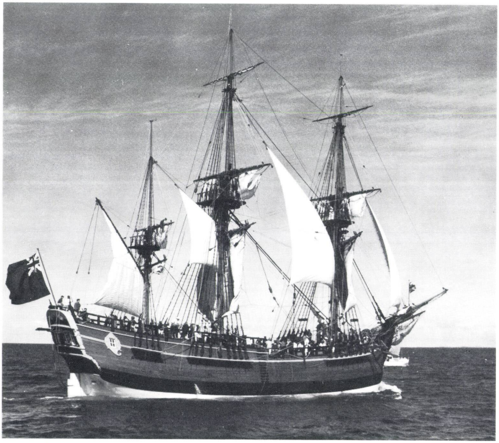
Captain RN, circumnavigator, hydrographer, explorer. Cook was born near Marton-in-Cleveland, Yorksire. He was an apprentice grocer at 17 and transferred his apprenticeship to a ship owner one year later. At 24 he had already risen from seaman to mate. Cook volunteered as able seaman in the 1756 war with the French. By 1757 he was promoted to master. Cook also helped to chart the St Lawrence River as well as taking part in the assault on Quebec. He commanded the schooner *Grenville* over the next three years on survey work.

Cook was commissioned as lieutenant in 1768 to command HM Bark *Endeavour*. The first circumnavigational voyage took place in 1768-1771. On the second voyage, with two other ships in 1772-1775, he again circumnavigated the globe and discovered numerous groups of islands in the Pacific.

James Cook was promoted captain and elected Fellow of the Royal Society. He sailed on his third and final voyage in 1776. Cook was killed by islanders in Hawaii 1779.

References

Discovery – Readers Digest, Sydney, 1978.
The Official Bicentennial Diary – Sunshine Diaries, Brisbane, 1988.
Printed matter from the *Capt. James Cook, Navigator* pavilion, Expo 88.



The ***Endeavour*** *replica in sail off the coast of WA. The ship was commissioned on 16 April 1994*
Photo: John Longley

Endeavour—1994

Photos by Robyn Webster unless otherwise noted

The replica *Endeavour* is a museum standard (twelve inches to the foot scale model) of the sailing ship in which Captain James Cook and botanist Joseph Banks sailed to Australia. The keel was laid in October 1988 in Fremantle and the ship was launched on 9 December 1993 and was commissioned on 16 April 1994. *Endeavour* is owned and operated on behalf of the Australian people by the non-profit HM Bark *Endeavour* Foundation.

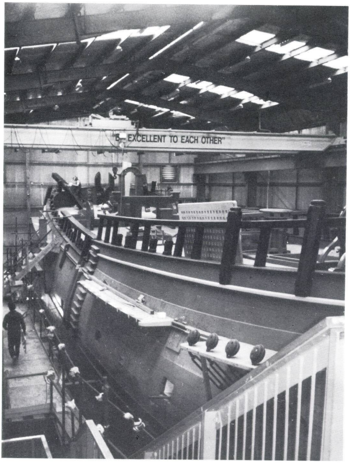
Endeavour, described as a three-masted bark, is built of jarrah and other West Australian hardwoods with American Oregon fir for topside planking and decks. The ship is 33m long with a beam of 8.89 metres and displaces 550 tonnes.

While *Endeavour* has been described as the most authentic ship's replica ever built, some modern equipment was built into the original hold for safety and hygiene.

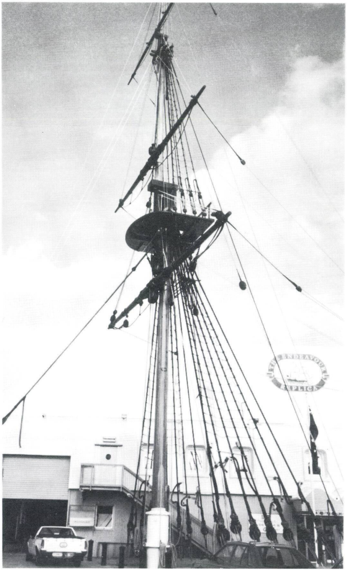
Endeavour's complement

Endeavour carries a crew of 15 full-time professionals with 30 voyage crew. The professional crew includes the Captain, First Mate, Second Mate, Bosun, Navigator, Engineer, four topmen, two junior topmen, two carpenters and a cook.

Crew duties are organized into four watches: fo'c'sle, foremast, mainmast and mizzen. Orders are passed from the Captain through the mates to the topmen, each of whom is in charge of one of the watches. For major manoeuvres like tacking or wearing ship (gybing), all hands are needed on deck. The watch crew on duty is able to handle sail trimming under ordinary circumstances. To set and take in sail requires all hands.



Endeavour *under construction at Fremantle June 1993—certainly better construction facilities than portrayed in Ron Lucas' diorama.*



The main mast outside ***Endeavour's*** *covered slipway.*

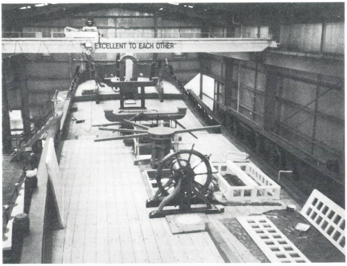
Sailing dates

Depart Fremantle October 2 at 10am; arrive Albany October 8 at 9am; depart Albany October 13 at 6pm; arrive Adelaide October 29; depart Adelaide November 6 at 6pm; arrive Hobart November 15; depart Hobart November 21; arrive Melbourne November 25; depart Melbourne December 9; arrive Geelong December 9; depart Geelong December 11; arrive Sydney December 18; through Sydney Heads 10.30am; arrive Farm Cove 11.30am.

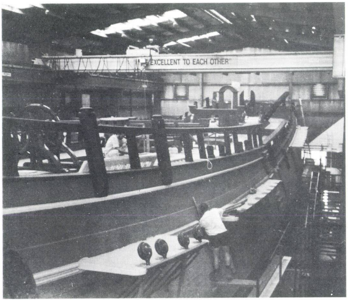
Official welcoming ceremony 12 noon at the Man o' War steps (near the Opera House). *Endeavour* will then sail down the harbour via Cockatoo Island, past harbourside spectator viewing points. The ship will then berth in Cockle Bay, Darling Harbour, for the general public to view at close range.

Note: *Endeavour* will not be open for visits on board until after its arrival at the new home berth, the National Maritime Museum, Darling Harbour Sydney, from 20 December, 1994.

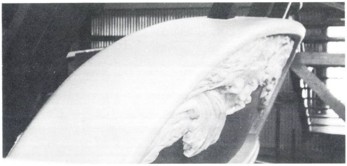
Our thanks to ***HM Bark Endeavour Foundation*** *and* ***Retter Marketing*** *for providing John Longley's photographs and the information for this article.*



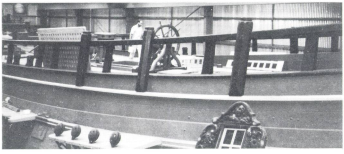
A general view of the deck with all the details being added.



It's not even finished and they're already walking the plank!

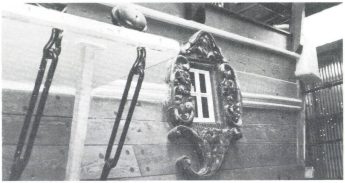


Stern carvings

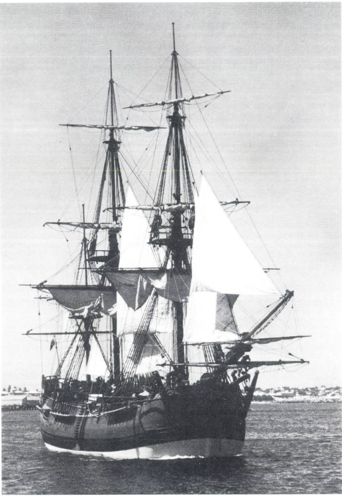


Working working... not long to go for the launch!

A sample rib cage was assembled to test the technique.



A close-up of the ornate carving around the Captain's window.



***Endeavour** replica in sail showing off the distinctive stubby nose.*
Photo: John Longley

Outdoor Garden Railways

in Gauges 0 and 1

by Paul Trevaskis

A number of readers have requested more information about small scale live steamers. That is, engines which run on O gauge (32mm) or gauge 1 (45mm) track, usually in the garden.

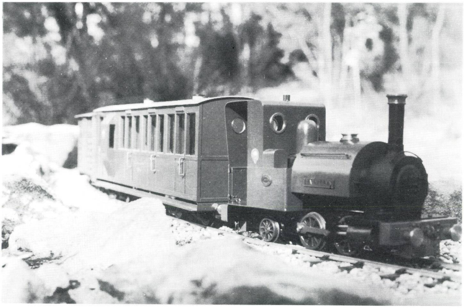

This narrow gauge train was built by Gary Spratling. The loco is a gas-fired live steamer running on 45mm gauge (Gauge 1). The layout was also built by Gary.

Photo: Gary Warton

Who makes them?

This article is to give an overview of what is available. For Australian prototypes, the only local manufacturer is *Argyle Locomotives* of New South Wales who builds a Baldwin Na (aka *Puffing Billy*).

- A gentleman in Sydney was working on a NSWGR C36 Class kit some time ago.
- There is a fairly big club in Western Australia and they arranged for the supply of components to build a number of West Australian G Class engines for themselves.
- *Roundhouse:* UK based, make a Fowler as used on the sugar tramways in Innisfail.
- *Aster:* the Japanese company, produces limited runs of various locomotives each year.
- *Mamod* is one of a number of companies in the UK that mainly manufacture narrow gauge engines. *Mamod* would be the cheapest with their oscillating cylinders and solid fuel pellets. I heard recently that slugs will eat the pellets!

The survivors

Roundhouse and *Merlin* would be the biggest manufacturers with radio control and either gas or spirit firing. In the last five years or so, companies have come and gone, those that have survived produce locos of excellent quality.

DJB, Finescale and *Wrightlines* are a few such companies. American outline locomotives are catered for by a couple of USA companies and Australia's *Argyle.*

Aster produces limited runs of various locomotives each year. The prototype is not confined to one country, they are usually standard gauge locos in gauge 1. Their latest is the NSWGR AD60 Garratt, spirit or coal fired. There are only five available for Australia.

Then there are the scratch builders. It would be impossible to try and guess how many locomotives have been built by individuals, from the glass case quality models to the battered and bashed example which has seen service on a backyard line for many years.

Modelling groups

There is no formal garden railway association in Australia.

There are clubs in Perth, Adelaide and some loose knit groups in Melbourne and Sydney. There is an active LGB Club in Sydney, however as LGB is electric powered, these gentlemen do not generally like live steam as many of "our" locos piddle oil everywhere.

The Association of 16mm Narrow Gauge Modellers is very active in England as is the Gauge One Association. There are members of both organisations here in Australia. There are many local clubs in America catering for both electric and steam.

Prototype Gauge	Model Gauge	Scale mm/ft	Ratio	Common Name
2ft	O	16mm	1/19	SM32 (UK)
3 or 2 ft	1	15mm	1/20.3	
1 meter	1	14mm	1/22.5	LGB, G scale
3' 6"	1	½"	1/24	
4' 8½"	1	⅜"	1/32	Gauge 1
4' 8½"	1	7mm	1/43	Gauge O

In America, the electric market has grown enormously in the past few years, this means that there is rolling stock available for a reasonable price, which can be adapted for our needs.

Scale and gauge

The scale things are built to can get complicated. The table may help to explain things. In 16mm scale, 2½" gauge track is considered standard gauge.

Depending on the prototype, there is really not much difference between models in 16, 15 and 14 mm scales. My single *Fairlie* is built to 16mm scale and it still looks tiny compared to a NA Baldwin (Puffing Billy) built to 15mm scale, both engines running on O gauge track. These engines will blend in with LGB stock which is 14mm. With the growth of G scale in the UK in the early 90s, some people run 16mm scale on 45mm track. Conversely it is common to find LGB or G scale rollingstock regauged to 32 mm. In America 1/20.3 scale on gauge 1 track is being used to represent the narrower prototypes.

Realities of outdoor life

Then there is stand off scale where if it looks all right from six feet away it is quite acceptable. This is more a standard of finish guide than an actual scale. Engines and rolling stock in the garden have to withstand all sorts of trials from leaves to cats and toddlers.

So it all depends on the prototype and what you want to do. The real beauty of narrow gauge is that almost any thing goes. Anything you do has probably been done in full size somewhere.

I hope to present some future articles on locomotive design parameters and how not to lay track. Not all the same rules apply in these small sizes as compared to the larger live steam gauges. We only want to pull a few light carriages around, so the loco is not working hard at all. The difficult part is getting things to happen slowly enough to enjoy "watching the trains go by".

If any readers have any ideas to share please put pen to paper. Just about anything at all is useful, photos especially. Even if you think it is too small, don't worry, they all add up!

Memories of the Miniatures

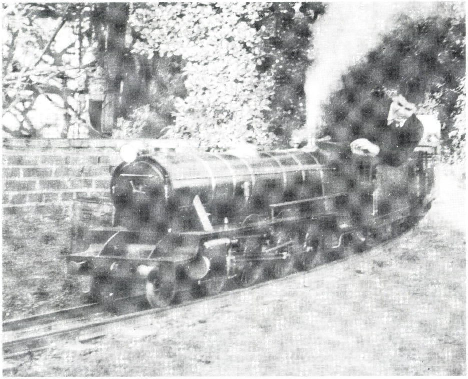
by David Burke

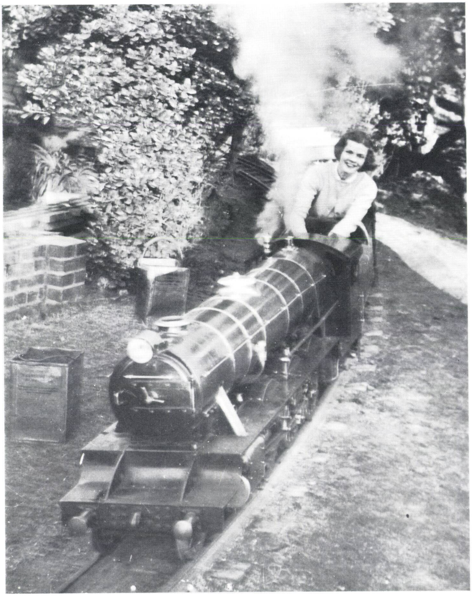
What became of the steam fairground railways of yesteryear? Those huge brass-bound locomotives—huge at least to a small boy—that once raced around amusement parks, beachfronts or esplanades and sometimes on private estates: where are they now?

Locked away in an attic, hidden behind the cobwebs in a backyard shed or rusting beneath a mound of rubbish?

Early miniature railways

Before the popular era of five and 7¼ inch clubs, a miniature steam railway was a rare phenomenon in this land. The Ravenglass & Eskdale or Romney Hythe & Dymchurch surely belonged only in 'My Book of Trains'.





***Above and left:** Driving the Pacific on Dr Hubert Bush's 10½ inch (260mm) gauge garden railway in North Caulfield, Melbourne.*

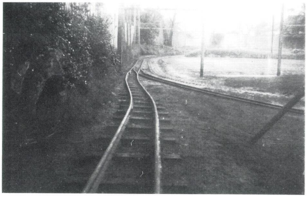
No wonder the few antipodean transplants of those great little lines would leave a nostalgic memory. Perhaps you have recollections of Mr Meadmore's private track in Warrigal road Burwood Victoria. How many Melbourne steam enthusiasts found a spark of inspiration in gazing at that early garden railway? Competing with Luna Park's big dipper, the pretty little line on St Kilda esplanade eventually fell on hard times. Last seen, its Pacific loco was minus the leading bogie.

Sydney had a scattering of beach-front lines at Cronulla, Ramsgate Baths on Botany Bay and many years ago at Manly pier. Steam appeared regularly at pre-war Brisbane's exhibitions—to the southerners 'the Show'. North of the city, a substantial line could be found on a reserve behind the trees at Redcliffe seaside resort.

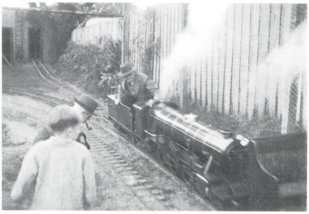
Private railways

Among the few old private lines, none could be more impressive than Dr Hubert Bush's 10½ inch (260mm) gauge in Orrong Road, North Caulfield. The retired Melbourne surgeon owned a handsome 4-6-2, built at Jack Mahoney's works in South Melbourne. Fast and powerful, in appearance it was closely akin to the Victorian Railways unstreamlined S class.

The line emerged from an engine shed to run among the trees and flower beds around the bush tennis court. An inner circle of joint 3½ inch (89mm) and 5 inch (127mm) gauges catered for lesser locomotives.



View from the engine shed towards the tennis court. The 'inner circle' of $3\frac{1}{2}$ and 5 inch gauges is visible



Watched by builder Jack Mahoney, the Pacific, with Dr Bush at the throttle, leaves by the loco road.

I was fortunate enough to live not far away in East St Kilda. Driving sessions were held on Saturday afternoons and sometimes on Sundays for special guests. An aged Sir Harold Clapp, father of the Spirit of Progress, is one who is remembered.

Rolling stock consisted of proper "sit in" wooden wagons, bogie and air-braked. "Many a time I've tackled a wound with these forceps", the old Doctor (who had been a medico on the Western Front in World war 1) would say as we worked together in the shed, making running repairs on the locomotive with the help of his retired surgical instruments.

Recollections

Barry Oakley, literary editor of the Australian—who lived in Melbourne as a youngster—recalled riding on Dr Bush's garden railway: "...There was a miniature railway line that circled a disused tennis court in the grounds of an old house near where I lived as a boy in East St Kilda in Melbourne. Its owner, Dr Bush, a genial retired surgeon, would sometimes let us ride on his little red steam locomotive that he maintained as a hobby..." (From The Australian Magazine, Jan. 15-16 1994).

Buried history

The late Hubert Bush's house was razed during the march of the developers and a block of home units now covers the site. Probably none of the residents know they walk on hallowed miniature railway soil. Dr Bush sold his classic Pacific and wagons in the 1950s to a buyer whose whereabouts are unknown. As far as I am aware, the locomotive has not been sighted since.

The Under 25s Encouragement Award

Conditions of Entry

Younger model engineers are making great contribution to the hobby, even though they are often hampered by having less access to tools and resources than older model engineers. AME instigated its award in 1993 to encourage under-25s to show their talents; to engender a spirit of encouragement in more experienced model engineers; and in a small way to foster the growth of participation by people in the younger age range.

We've been pleased to hear that a number of under-25s have been spurred on to complete their models by the thought of participating in the award.

Last year's winner was David Lance of the Sydney Society of Model Engineers—see AME issue 55 page 33 for details.

If you fit the age criteria, photocopy the entry form on the next page, post or fax it to AME and start a-fittin' and a-turnin'!

Age criteria

If you turn 25 in the 1995 calendar year or later, you are eligible. If you turned 25 in the 1994 calendar year or earlier you are not eligible.

Entries

May be any model or experimental engineering item or model. For example it can be a steam, diesel or electric outline locomotive; steam, internal combustion, electric, hot air and Stirling cycle stationary or mobile plant or road vehicles; boats or ships with any form of power drive; marine plant; workshop equipment, jigs, fixtures and aids to manufacture; clocks and other horological or astronomical items; electronic, programmable logic, digital and analogue controls and monitoring of any of the above models—or any other item(s) which the judges consider relevant to model engineering.

Judging

The following will be taken into consideration:

- The age of the entrant and skills relevant to age.
- The ambitiousness of the project.
- The workmanship of the project.
- The access to workshop facilities.
- The location to resources and materials.
- The formal skills of the entrant.

The above is intended to even out the playing field so that the judges may look at each entry "all things considered." The idea is that the thirteen year old student (with no formal mechanical skills) from the Back'O'Bourke who works in a tin shed with pistol drill, hacksaw, file and hand scraper to build a model of a ferris wheel has as much chance as the 25-year-old qualified thou-splitting toolmaker with a CNC workshop and limitless resources who has turned out a VR H class 4-8-4 with working stoker engine!

Have a go!

The presentation will take place at the AALS convention at Townsville this coming Easter. Entries will be received up to day one of the convention. The perpetual trophy will be awarded at the AALS presentation night on Sunday evening. A prize (to keep) relevant to the winner's interest in the hobby will also be presented.

So come on all you younger model engineers, let's see the tables with plenty of entries on them in Townsville this Easter!

See the Coming Events column for contact details of the 1995 Townsville Convention

Australian Model Engineering

The Under 25s Encouragement Award

Entry Form

Name . . . . Age . . . .

Address . . . .

. . . . Phone . . . .

Club or Society (if applicable). . . . .

Qualifications and/or occupation . . . .

. . . .

Brief description of entry . . . .

. . . .

. . . .

Approx. dimensions & weight . . . . (Enclose photo if possible)

Equipment used in construction (e.g. lathe, drill press, hand tools etc.) . . . .

. . . .

. . . .

Other information relating to the entry (eg. outline of construction and assistance had, if any)

. . . .

. . . .

. . . .

Australian Model Engineering undertakes that the privacy of entrants will be respected.

I hereby declare that:

1. I have personally constructed at least 75% of my entry.
2. I was under 25 years of age as at 31st December 1994.
3. I agree to the conditions of entry and that the judges decision will be final.
4. I agree to display the entry at the AALS convention site for the purposes of judging.

Signature . . . . Date . . . .

Steam Chest

with Dave Harper

Welcome to another collection of Steamollania, which seems to me to be a nice portmanteau word for miscellaneous steam stuff.

I've had a real windfall recently, as far as material for this column goes; a gentleman came into the museum of the Qld Steam and Vintage Machinery Society at Petrie, where I spend most of my weekends, and offered to lend us a collection of model steam engines made by his late father, for permanent display in our collection. Naturally, this offer was accepted on condition that the models were worthy of display, and I duly went to see them shortly after.

Well, there are seven engines and an incomplete vertical boiler in the collection. They are all completely different from any model steam engines any of us have seen before, so we grabbed them for our collection!

Some of the engines are of recognisable type, others have us baffled as to their origin and purpose. They were built in the 1950s by the late Johan Raadschelder, a Dutch migrant, in conjunction with a workmate who had been a marine engineer.

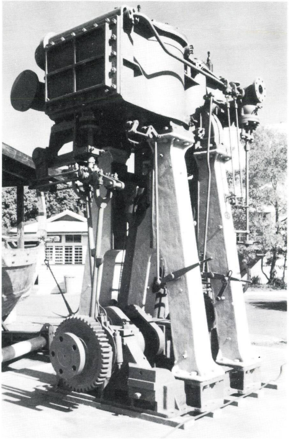
They all were obviously made to work, and after a scrub up and a drop of oil, they all turn over quite nicely. While not finished to exhibition standard, they are made in a workmanlike fashion, obviously from whatever materials were to hand. What does have us mystified is the number of very nice castings used on the engines, as none of us have seen anything similar. Were they specially made? Are they once-available commercial castings? I'm hoping some of you out there can enlighten us!

Unfortunately, both builders have long since passed away and Mike Raadschelder, our benefactor, has no knowledge of the technical details of them: he just wanted them to go to a good home rather than gather dust under his house! This we are very happy to give them, and they are now in a glass case; some will be hooked up to an air line in due course so they can be run from time to time. I've decided to feature the engines one at a time in this column, which gives me time to partially dismantle them to photograph them, and to try to figure out how they work!

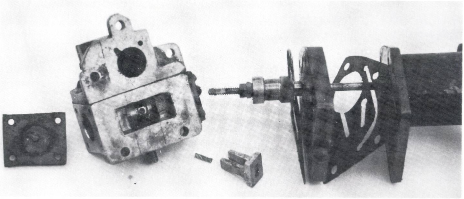
The first one is the most puzzling, being a vertical engine of about ¾" bore and an inch or so stroke, driving nothing more than a plunger through the base plate.

Like several other of the models, the valve arrangement is similar to that of a Weir pump, i.e. a shuttle valve is driven by steam to reverse the steam ports at the end of each stroke. However, the way this one seems to work is pretty complicated, as follows: the main piston seems to be hollow, and a rod is connected to a driving boss in such a way that the rod only travels about half the distance of the main piston, the rest being lost motion.

This rod drives what looks like a piston valve up and down within an auxiliary cylinder on top. As it moves, this valve directs steam through various ports which in turn cause a transverse piston to move from right to left and back at the end of each stroke. This transverse piston in turn drives a sort of D-type steam valve which reverses the flow of steam to the main cylinder via some fairly convoluted passages and thus drives the piston back on its next stroke. The device runs on compressed air, and I wasn't game to dismantle it too far as there are obviously numerous adjustments which I wouldn't like to lose.



The twin compound engine at the Qld Maritime Museum. The engine is from the dredge ***Fitzroy****, which used to operate on the Fitzroy River at Rockhampton*



An exploded view of the late Johan Raadschelder's engine showing the upper piston valve, the transverse valve in its bore, and the D valve with lugs that engage in cutouts in the transverse piston.

The photo shows an 'exploded' view showing the upper piston valve, the transverse valve in its bore, and the D valve with lugs that engage in cutouts in the transverse piston. The tiny coil spring holds the D valve on to its seating, and the steam passages can be seen cut out of the gasket that fits between the main cylinder casting and the port plate.

The round headed screw covers the exhaust port; steam inlet is at the top of the transverse valve, covered by a grub screw. As can be seen, several castings are used in the construction of the engine, and the bar across the plunger also seems to be cast.

Does anyone have any ideas on the what, why and how? All replies via the editor will be appreciated, and answered.

Whose slide are you on?

During one of my occasional chats with our editor, Brian Carter, it was suggested that descriptions of various parts of full sized steam engines would be of interest.

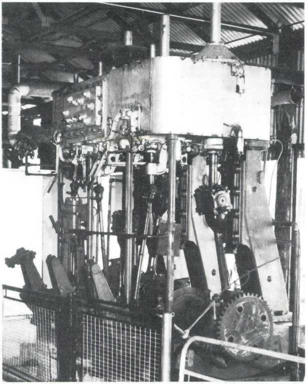
One part that seems to come in a great variety of shapes is the cross-head and guide, and I made some mention of this in the last issue about the ST *Forceful* engine. So, this time I'll follow on with a couple more marine engines, but later I'll do a fuller coverage of the evolution of the crosshead from Newcomen onwards.

As mentioned last issue, most marine engines have a 'forward' and a 'reverse' guide. These can be seen in the photo of the triple expansion engine in our QSVMS collection.

The sloping columns at the rear of the engine have the guides on their front faces; the forward direction of rotation is anti-clockwise in this view, with the cranks moving away from the columns as the piston starts its down stroke. This means that the angular force of the connecting rod is taken by the full width of the slide on the main columns.

The reverse guides, bolted on to the columns, only work on relatively narrow slides on the edges of the crosshead. Obviously these narrower slides would wear much faster in continuous use, but with the small amount of reverse running that most marine engines do, this is not a problem, and allows the more economic single column construction.

The alternative can be seen in the photo of the twin compound engine, taken at the Qld Maritime Museum. The engine is from the dredge *Fitzroy* which used to operate on the Fitzroy River at Rockhampton, if my memory serves me rightly. This engine has full twin column construction with full guides on each side, similar to the *Forceful* engine—more durable, but heavier and more expensive.



Most marine engines have a 'forward' and a 'reverse' guide. These can be seen on the triple expansion engine in our QSVMS collection.

Another mystery engine

Looking for pictures of crosshead guides I came upon the picture below, which shows a duplex (i.e. twin high pressure cylinders) engine that belongs to Peter MacDonald of the Gold Coast. He brought it up to our rally last year, looking for someone that recognised it. As only part of the base remains, Peter has mounted the whole thing on a board.

As can be seen, the piston rods are extended to run in outrigger bearings, and the con-rods are stirrup shaped to clear them—all simple and easy to build. The cylinders are 2½" bore by 4½" stroke, and the general style of the engine seems to be that of one made for a steam car. Does anyone out there recognise it?

One for the birds

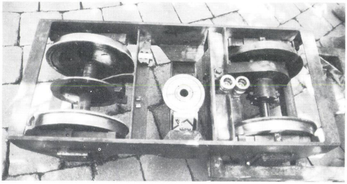
Finally, I had a delightful day out recently with two old friends, going to the Currumbin Bird Sanctuary on the Gold Coast. This National Trust-owned park is renowned for the parrot-feeding sessions when hundreds of multi-coloured parrots come from the surrounding bush for a feed each morning and afternoon. Unfortunately, the day we were there, there was a terrible pall of smoke from nearby bushfires which seemed to keep most of the birds away.

However, the main reason for our visit was to have a look at Currumbin's other claim to fame, its 11½" guage railway, which loops around the grounds, saving tourists from wearing out their shoe leather around the place.

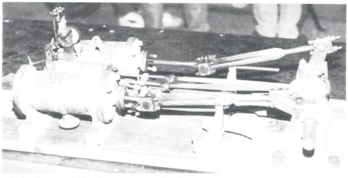
Pride of the locos is a beautifully maintained 2-6-2 steamer which, according to its makers plate, was made by J. Jackson in 1964. This is none other than Jimmy Jackson of QSMEE, one of the grand old gentlemen of model engineering in Queensland. The loco appears to be as good as new, a tribute both to Jimmy's building and the operator's maintenance!

The park also has two diesel hydraulic locos, built to resemble QGR types: one a hood style, the other a cab type. The photo shows a bogie taken off the cab-type diesel for maintenance. It shows the hydraulic motor driving one axle, the disc brake on t'other axle, and the off-set pivot to put more weight on the driving wheels. Both bogies on each loco are of this pattern, apparently.

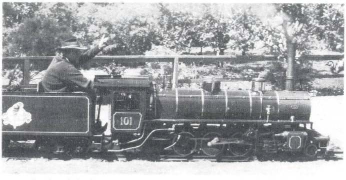
Well, that seems to be all for this time. I'd better start researching crossheads and things for next issue! Till then, happy steaming.



A bogie taken off the cab type diesel for maintenance. It shows the hydraulic motor driving one axle, the disc brake on t'other axle, and the off-set pivot to put more weight on the driving wheels.



A duplex (twin high pressure cylinders) engine that belongs to Peter MacDonald of the Gold Coast.



Pride of the locos at Currumbin is a beautifully maintained 2-6-2 steamer.

Steam Chest

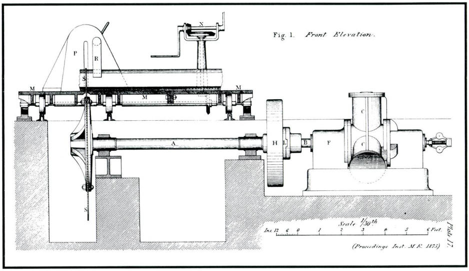
with Dave Harper

Special Feature

Following on from Don Payne's excellent article on his model three-cylinder steam engines featured in issue 51, Nov-Dec 1993, I discovered, during my research on radial steam engines at the University of Queensland's Engineering Library, a paper which I think most readers will find fascinating. I came across the following story in the *Transactions of the Institute of Mechanical Engineers,* which date back to about 1870. In the set for 1875 was...

Description of a Direct-Acting Circular Saw for Cutting Steel Hot

by Francis W. Webb of Crewe UK



A large circular saw, designed and constructed by Mr Ramsbottom, has been employed during the last ten years at the Crewe Steel Works for cutting the Bessemer Steel blooms etc. whilst hot, and has been found very efficient and advantageous in economising time and work.

The saw is 7ft in diameter, driven by a pair of locomotive cylinders, 17" by 24", running at 100 rpm, with a speed at the circumference of the saw of 13,000 ft per min, or 150 miles per hour. In conseqquence of the engine running so much slower than the saw, it is requisite to advance the work upon the saw gradually, in order to avoid the risk of stalling the engine or breaking the gearing; and in the event of anything failing in the machinery, such as the occurrence of a broken tooth in the gearing, serious damage is likely to arise on account of the high speed of working.

It occurred to the writer that an application of the Brotherhood three-cylinder engine, working direct upon the saw shaft and running at the same speed as the saw, would successfully remove the above difficulties, and would give important advantage in simplicity and economy in construction. This has been carried out, and the machine is working satisfactorily at Crewe, as shown in plates 17, 18 and 19. Fig.1 is a front elevation of the saw and engine; Fig. 2 is a transverse section at the saw; and Figs 5 and 6 are transverse and longitudinal sections of the engine.

The saw S, Figs. 1 and 2, is 7ft in diameter and 5⁄16" thickness, and is mounted between two cast-iron face-plates, leaving 15" breadth of the saw projecting all round; the teeth are 1½" pitch.

The saw is fixed on a steel shaft A, 6" diameter, constructed with two bearings, each 12" length; and the shaft is coupled direct to the shaft B of the engine, which is a Brotherhood three-cylinder engine, with single-acting cylinders CC, 14" diameter and 8" stroke, and internal connecting-rods in the form of simple struts acting upon a single crank-pin D, Figs 5 and 6.

A single cylindrical valve E rotating with the crankshaft serves to supply steam to the three cylinders; and the extreme simplicity of construction of the engine allows it to be driven at a very high speed without any risk of derangement.

For meeting the high speed, the engine shaft is constructed with a very long bearing FF of phosphor bronze, 25" length and 5" diameter, having a central cavity G, Fig 6, 7 in long, formed between the main casting and the brass, which is filled with water, and is connected on both sides with the water main. This water supply ensures the bearing being kept cool, and in the event of any warming commencing a circulation of water is set up, which carries off the heat.

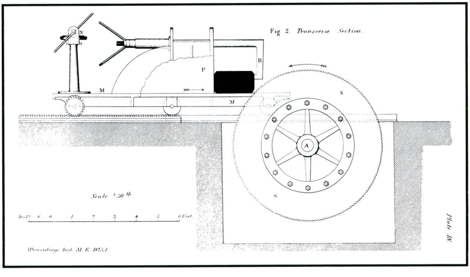


Fig. 2. Transverse Section.
N
P
R
M
M
S
A
S
Scale 1/30th
Ins. 12 6 0 1 2 3 4 5 6 Feet
(Proceedings Inst. M.E. 1875.)
Plate 18.

A flywheel H, Fig 1, 4ft diameter, is fixed on the saw shaft, with a disc upon its face for coupling with the engine shaft. This coupling is of special construction, for preventing any strain coming upon the engine shaft in consequence of any slight alteration of level in the saw shaft by wear of the brasses or settling of the foundations.

The coupling, which is shown in Figs 3 and 4, Plate 19, consists of two discs J and K, 18" diameter, one keyed to the end of the engine shaft B, and the other bolted to the face of the flywheel H on the end of the saw shaft A; and an intermediate steel disc or driving plate L, 1½" thickness, fits close between them, having two projecting ribs with square edges, one on each face, 4" wide and 1" projection. These two ribs are at right angles to each other, as shown in Fig 4, and fit into corresponding grooves in the face of the two outside discs J and K upon the shafts, and serve as a coupling between the shafts. The driving plate L is loose between the discs J and K, and would thus allow the two shafts to be out of line without causing any strain; and the two ribs being at right angles upon it prevent it from getting displaced.

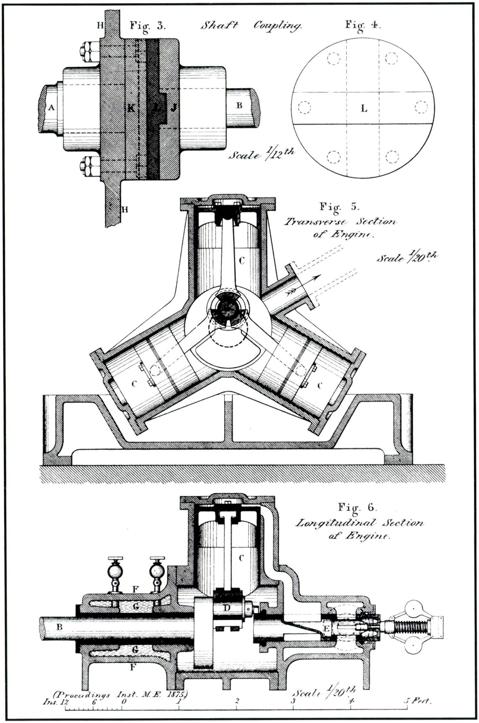
The work to be cut is brought up to the saw by a travelling table M carried on wheels, Figs 1 and 2, sinilar to the table used with the original saw, and moved by a rack and pinion with a double winch worked by two men. A stop block P is provided, with a screw retaining-claw R for holding the work during the process of sawing.

This simple construction of saw, with the direct acting and continuous driving power given by the three-cylinder engine, has such complete command over the work that a large steel ingot can be pushed forward rapidly upon the saw without risk of stalling the engine or of any accident from failure of gearing.

The action of the saw in cutting a large steel ingot is quite smooth, and as easy as that of an ordinary rail saw. A jet of water plays on the saw when the cut is heavy, to prevent the teeth getting overheated. A steel ingot 10" square is cut through in 25 secs with 50lbs boiler pressure of steam; and a larger ingot 20 ins diameter has been cut through by two cuts, one from each side and meeting in the centre, and the end of a crank slab 22" by 12" has been cut off in 3 min 5 sec.

The use of these large saws has proved very advantageous in making steel forgings, by giving the means of cutting the Bessemer ingots accurately to the sizes required to be made, so as to avoid surplus material; and an important saving of time and of reheating is effected, as this cutting is done at the first heat, the ingot being brought to the saw whilst hot from the hammer.

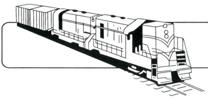
The saw is also used for cutting out crank axles, and gives the means of roughing them out very close to the finished dimensions. Further applications of the saw are contemplated; for instance, cutting rails for making points, by setting the rail to travel up to the saw on an inclined bed giving the required taper in the cut. A saw of half the diameter is proposed for that purpose, driven at double the number of revolutions per min, so as to give the same velocity at the circumference as in the large saw.



(Proceedings Inst. M.E. 1875)

In answering questions from the audience Mr Webb said that he had not had an opportunity of comparing the results of the two modes of driving the saw, in regard to the power required; as far as economy of steam was concerned he did not think there was much difference. But after there had been accidents with the previous machinery, the gearing having been sent flying through the roof twice, and the engine house knocked down, he thought it was requisite to devise something more economical in machinery and less dangerous to the men attending the saw.

What price Workplace Health and Safety in those days! And what a fascinating modelling project it would be, maybe not cutting steel ingots, but demonstrating the action, using hardwood blocks, of the technology of 120 years ago.



Club Roundup

Coming Events

10 to 13 January
Open invitation to Manu Ariki, NZ

Come and join the fun at the 7¼" gauge Manu Ariki railway - Taumarunui. A variety concert will be held on Wednesday night (11th) cost: $25.

13 to 15 January
Rotorua NZ open weekend

Call in at the Rotorua open weekend on your way home from Manu Ariki. 3½", 5", & 7¼" gauges. All Welcome.

10 to 13 March 1995
Small Gauge Revival, Moorabbin Vic

Clean up your 1¼", 1¾", 2½", 3½" (5"?) gauge locos for a small gauge gauge revival weekend at the Steam locomotive Society of Victoria's club track at Rowans Rd. Moorabbin.

Contact: John Auty (03) 579 2880

1 April 1995
Western Port Vic

BHP Western Port Railway Society extends an invitation to "All-comers day". Clubs will be contacted during February 1995 with details.

Enquiries: Lois Carter, B.H.P.W.P.R.S. Publicity officer, Bag 1, Hastings, 3915

14 to 17 April 1995
AALS Convention

At Townsville Qld. Enquiries to:
Convention Secretary, Laurie Fielder
PO Box 90, Hyde Park, Qld, 4812
Phone (077) 88 8200, Fax (077) 88 8318

Easter Weekend 1995
Invitation - Gore NZ

All clubs are invited to the opening of our club rooms and raised track. We are also hofting the Easter Meet and exhibition the first steam trials of the South Island Association of Model Engineers.

Gore Model Engineering Club Inc.
Contact: G. Head (NZ) 208 5001

6 and 7 May 1995
Invitation run - Mackay Qld

Just four hours south of Townsville. Join us on the May day weekend. All convention travellers welcome to drop in for a run any time.

Contact: Col Etwell (079) 52 2401 or Len Heaton (079) 59 2169

5 to 10 January 1996
Steam Expo 96 - NZ

At the Ottago Model Engineering Society. Contact the exhibition convenor for details. PO Box 2163 Dunedin South. New Zealand.

39th Australian Association of Live Steamers Convention

Townsville Queensland
14–17 April 1995

General Information

Boilers: all current boiler certificates must be presented and sighted by the boiler inspector before steaming.

Power: 12vdc and 240vac power will be available. Compressed air is also available.

Fuel: lighting-up wood, Blair Athol coal, ordinary lubricating oil, steam oil, four and two stroke fuel will be available during the convention.

Parking: the area around the unloading ramp is to be kept clear at all times, except when unloading or loading. Vehicles are to be parked outside the park in an are set aside for the purpose.

On-site registrations: open at 3.30pm Thursday 13th. and 8am Friday to Monday. Convention closes 5pm Monday 17th.

Reception

A welcoming reception will be hosted by the Townsville City Council at the society grounds on Thursday evening, 13 April, 7pm. Drinks and a light supper will be provided. A good opportunity meet old friends and make new ones, as well as to meet members of the host society.

Catering

To assist with catering arrangements we ask that all registrations be received NO LATER than 3 March 1995. No booking no meals!

Competition

To add to the fun, three competitions have been arranged. (a) Marshalling wagons in order. (b) Hill climbing with a load and (c) the most used/run locomotive over the Friday Saturday and Sunday. You have to indicate on the registration form if you intend to participate.

SEND IN YOUR REGISTRATIONS NOW!

Fairfield NSW

Things are hotting up at the Fairfield Showgrounds as the local council are looking at ways to make the showgrounds self supporting. A draft of the council proposal is yet to be forwarded for inspection.

The club is in the process of laying a concrete apron at the ground level steaming bays. This will enable trailers to be manoeuvered by hand easier, rather than trying to back up under vehicle power and possibly causing damage to vehicles and/or facilities.

Western Districts Live Steamers Co-op Ltd.
Location: Fairfield Showgrounds, Smithfield Rd. FAIRFIELD.
Public Running day: Every Saturday, also 3rd Sunday of the month.

Warner Qld

The extension to the carriage shed is effectively complete, the doors are fitted but despite the valiant efforts of Barry Beale, the finial has yet to be mounted! The base of the elevated track extension is complete and awaits the joining of the new track to the original line.

An underground conduit now carries cables for the points and signals from the signal box, past the station and on to the end of the bridge.

Pine River Shire Councilors visited the track on the evening before the September running day. They were surprised to find that such a place existed! We are pleased that our local authority now has a greater awareness of our endeavours.

Queensland Society of Model and Experimental Engineers Inc.
Location: Warner Rd. WARNER
Public running day: 2nd Sunday of each month.

Geelong Vic

The Geelong Society of Model and Experimental Engineers have a new mailing address. Please address all correspondence to:

The Hon. Secretary
GSMEE
PO Box 442
Geelong, Victoria, 3220

The society also wishes to advise that the Secretary is now John Lydom, following the resignation of Tony Anderson.

Geelong Society of Model and Experimental Engineers
Contact: The Hon. Secretary

Moorabbin Vic

A few society members have produced some interesting projects lately. Bob Elliot has been working on a steam generating set using a small motor as the generator. The first trial produced 0.5 volts but a later run achieved 1 volt! Although it wasn't enough to light a lamp, it was sufficient to demonstrate to students, the conversion of heat energy to electricity using steam power. Bob also has a larger turbo generator that has just the right "whine." Graham Plaskett has test run his first steam project, an oscillating engine with boiler. George Albany has had several runs with his new GWR Mogul. The loco is settling in well and will soon be seen on public passenger work. John Campbell's, Don Young designed, Porter is running at last! Teething troubles included slipping arms on the valve rockers, this was cured by cross-pinning—after some cross words!

The Steam Locomotive Society of Victoria Inc.
Location: 128 Rowans Rd. MOORABBIN
Public running day: 1st Sunday of each month, except January.

Gisborne Vic

The May rally and the December tractor pull continue to be the main fund raisers of the society. The December 1993 tractor pull (our first) proved to be both a great public attraction and a financial success. On the same day, the Engineering Workshop Museum was opened to the public for the first time. The museum is expected to be completed in time for the 4 December 1994 tractor pull. The 1994 highlights include: connection of SEC power to the Ratcliffe pavilion; the steaming of the 2ft gauge *Perry* down 50m of track; the steam roller steaming around the streets of Gisborne and back up Gisborne hill (not without some spots of excitement); and the 7¼"g railway extension and station nearing completion.

Gisborne and District Steam & Engine Society
Location: Gisborne Steam Park, Webb Cr. NEW GISBORNE

West Ryde NSW

A special event occurred at the track recently, Jeff Sorrenson's 5"g NSWGR 3142 has finally been out-shopped after extensive restoration! The loco was put to hard work at the August running day, after a successful steam test.

Bill Richards was in a bit of a spin at the September running day after he observed drivers Tulloch and Sorrensen with their locos just about ready to steam at the official starting time. Apparently there is talk of a commemorative medallion being struck to honour the event!

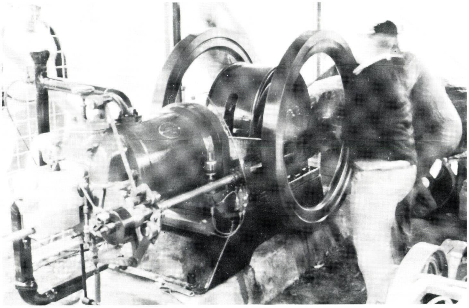
The new foot bridge is rapidly nearing completion. The old bridge will be dismantled after the November '94 running day. This will leave the way clear for the preparations of the footings and mounting of the galvanized steel structure.

Sydney Live Steam Locomotive Society
Location: Anthony Rd. WEST RYDE
Public running day: 3rd Saturday of each month

Galston NSW

The society's annual October steam festival was a great success. Many of our regular visitors attended, and this year—NO fire ban!

The public was out in force to see the railway and the static display. Many new projects were on show this year. One locomotive, a New York Central 4-6-4 under construction by Bert and Russell Freeman, is a massive model for 5"g and will prove to be a powerful machine when it is finished.



The Ronaldson and Tippett full-size stationary engine at the Hornsby and District Model Engineers' Galston Valley Railway. This action shot shows three society members cranking the engine over for its maiden run in its new location. The three blurs from centre to right are: the project leader, Garth Cantrill; Angus Paton and Guy Gadsden.
Photo: B. Carter

Garth Cantrill was a happy man on Saturday, when his long awaited dream came true. The club's Ronaldson and Tippett engine came to life once more! The engine had been in operation a few years ago, but had been moved to its new location in a purpose-built pavilion. The engine's previous location was in Martin's Place, the club's exhibition pavilion. It was felt that a new pavilion, to house all of the club's full-size stationary engines, would be a far better display solution.

The Ronaldson and Tippett engine was built in 1933 and sent to Concrete Constructions at Boggabri in NSW.

The engine is described as a four stroke, 20 nominal brake horsepower stationary type with surface ignition. The cylinder has a 312mm bore and 452mm stroke giving a swept volume of 34.56 litres with a 4.1 : 1 compression ratio. The governed engine speed is 180-230 rpm operating on the hit and miss principle.

The kerosene burning engine has a vaporizer which has to be externally heated by a special multi-burner primus lamp before the engine can be started.

The engine's restoration has taken place over about five years, with many members pitching in, ably led by Garth Cantrill. The society has a very strong stationary engine following with several smaller hit and miss engines being restored to working order.

This year saw the inauguration of the Phil Coleman award for *The Best Working Internal Combustion Engine.* The award was won by Bob Short for his 6cc two stroke engine which was recently built using an old set of castings. Although there was a low participation this year, there are signs of interest increasing with many more models under construction.

The award, a trophy and $50 cash, is intended to foster an interest in internal combustion engine modelling. To this end, it is open to members of any club who care to enter.
The basic rules are:

- Engines completed prior to June 1993 are not eligible.
- Each engine can win only once
- The engine should be run, or capable of being run during the HDMES October weekend exhibition.

The award will be available for three exhibitions, if you missed out in 1994, try again in 1995 or 1996!

Hornsby and District Model Engineers Society Co-op Ltd.
Location: 29 Mid Dural Rd. GALSTON
Public running days: 2nd Sunday of each month, other days by arrangement.

Club Roundup contributions

AME is pleased to receive club newsletters for consideration in this section. Newsletters are often a good source of articles, which we appreciate all the more, but most of all they help us keep in touch.

It is often difficult to decide what to publish and what to leave out. and the task of selecting material for a wider audience takes a lot of time. Also, there is always the risk that AME will publish something that the club considers sensitive. Please help by sending a "press release" page with your newsletter, or highlight the items you think we could use. We'll give first preference to clubs that help us out this way.

Knee Deep in Tulips

Canberra's Second Invitation Run

by Gerardus Mol

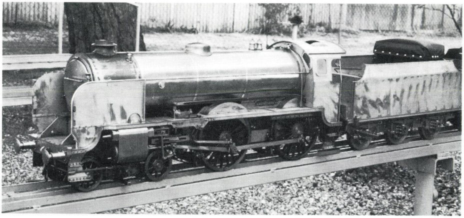
About 25 locomotives attended Canberra's second inter-club run on 24-25 September. The event was run later than last year to escape Canberra's cold winter weather and to coincide with the Floriade Spring Festival.

As usual, a number of people arrived early to get in some quiet steaming before the rush started. Neil Mackenzie and Ken Saunders, both from MELSA in Queensland, steamed up their respective locomotives. Neil's Queensland Railways B12 2-6-0 loco in 5-inch gauge was soon out on the track hauling its little covered four-wheeled "A" van. Ken steamed up his 5-inch gauge Heisler: when driven "fast" (how fast can a Heisler go?), it sounded more like a petrol loco than a steamie. It just purred like a kitten all weekend.

Saturday turned out to be overcast and windy, but those conditions helped to show off the steam and blow the smoke into or out of our eyes, depending on which way we were heading! The steaming bays soon began to fill with engines of all shapes and sizes.

During the weekend there were very few delays on the railway, due to the tireless, diligent people who operated the signals and points.

Again the event was opened by the ACT Minister for the Environment, Land and Planning, Bill Wood MLA, who stayed for more than an hour after the ceremony, enjoying the activities and taking John Nicolson's 7¼ inch gauge *Black Five* for a couple of laps.



Bill Henderson's 7¼" gauge ***Schools*** *class loco.*

Photo: Geradus Mol

The prize for the best locomotive went to Neil Mackenzie for his beautiful QR B12 loco. With a prize of an angle grinder donated by Fisher Discount Workshop Machinery, Neil was a happy builder indeed.

Some of the locomotives that took to the rails over the weekend included Bill Henderson's excellent 7¼ inch gauge LNER K1 (2-6-0) and Reg Watters' GWR *Manor* 4-6-0 hauling its string of Great Western rolling stock, which is always admired wherever it goes. Lindsay Brack drove his 0-6-0 saddle tank loco hauling a rake of NSWGR goods stock. This loco is modelled on J.&A. Brown's No 2 *Avonside* loco, which ran at the Newcastle coal-fields. It ran all weekend and was one of the last to leave on Sunday night.

Another "train set" that caught people's attention was Walter Shellshear's NSWGR 4-4-0 12 Class loco — number 1210, the engine that hauled the first passenger train into Canberra. Members were sad that this run also marked Walter's departure: he is moving to a retirement home at Bayview to the north of Sydney. Walter has vast experience and has always been a popular, much-admired and respected foundation member of CSMEE.

Some visitors spent the night in 12-inch-to-the-foot scale sleeping cars, waking to find Sunday a better day weather-wise, although still a little breezy. Those with wider interests spent some time in Commonwealth Park enjoying the flower displays; others stayed closer to home and visited the ARHS railway museum and Bill Cleary's private rail vehicles next door. And of course there was plenty to enjoy on the CSMEE track. Diesel outline locos included the NSW X200 class, 45 class and 80 class in 5-inch gauge. In 7¼-inch gauge there was a Bo-Bo variant of the Alco light lines diesel — of the NSW 48 and AN 830 class family — built by Les Boyd of the Berry Railway. One ring-in was David Burke's (formerly John Hagan's) 7¼ Sydney R class tram, which had been very "tram" peramental on the first day. After some changes to the wiring and batteries, it soon gave much enjoyment for the younger visitors to drive.

The second Canberra invitation run was a great weekend, with a good cross-section of motive power and scale rolling stock to suit all tastes. It was a very enjoyable occasion to share good times with other model engineers.

Walter Shellshear's 5" gauge 1210 plus rake of scale wagons.

Photo: Melanie Dennis

Wagga Wagga

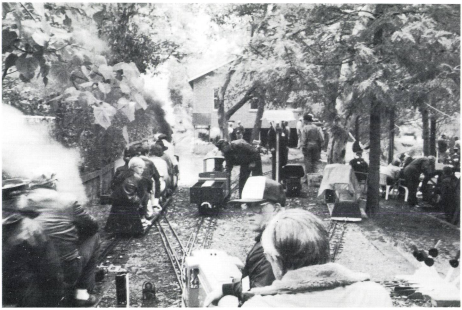
Windy Weather, Warm Welcome

by Clive Huggan

What timing — storms lashed the entire eastern seaboard of Australia on the weekend of Wagga Wagga's invitation run! The trees and shrubs of the upper slopes of the Botanic Gardens, which have matured beautifully in the last two years, had fewer limbs and leaves on them by Sunday afternoon when play was halted early by President Jim Leitch. But over all, showers and gusts didn't make much of a dent in the activities: on Sunday 6 November, 1400 public passengers were carried in five hours.

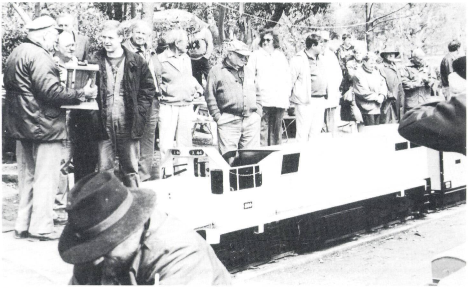
The gathering

This venue is becoming the gathering place for people from afar: more than 250 visitors, 51 steam locomotives, 14 petrol and electric locomotives and 2 traction engines came from Maryborough, Toowoomba, Adelaide, Tamworth, Warrnambool, Newcastle, Echuca, Wollongong and Berry, as well as Sydney, Canberra and Melbourne. Smiles were everywhere as newcomers got to know each other and old friendships were renewed.



There was plenty of traffic on the weekend, it kept the signallers on their toes. The new club room is barely visible in the background.

Photo: Clive Huggan



The WWSME Achievement Award was won by 20-year-old Andrew Mierisch, of Diamond Valley Railway, for his impressive 7¼ inch gauge VR X class diesel outline loco.

Photo: John Meagher

Such smooth events don't happen by accident, of course. Everything was very well prepared, obviously by great teamwork, including Works Manager David Frost's preparation of the grounds, Secretary Cec Appelbee's always excellent organization, and the efforts of Ruth Lennon's Catering Corps. The club members' motivation is to keep up the legendary welcome; and as Jim Leitch said, "Our friends' enjoyment is our reward." The enjoyment was best summed up by a Victorian visitor who said: "We came for a good time; we're having a great time; to hell with the weather!"

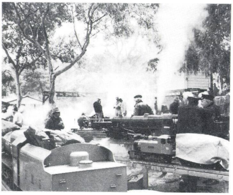
New club room

Nestling among the trees was a newly completed brick building, in the style of an engine shed, which housed trade stands and an HO scale layout of Stockinbingal built by members. Now the club has room, members will be making special efforts to attract static models to future events. And they will be inviting visitors to use their newly graded traction engine track.

Presentations

The WWSME Achievement Award was won by 20-year-old Andrew Mierisch, of Diamond Valley Railway, for his impressive 7¼ inch gauge VR X class diesel outline loco. It's powered by a Mazda 323 engine driving a 200-amp aircraft generator, which supplies four 1930s-vintage Dodge starter motors with modified brushes. John Wakefield won the Riverina Steel Fabrications trophy with his magnificent 5-inch gauge South African Railways "16F" Pacific.

Times do change, of course: five mobile phones were seen. Who was the dad who telephoned his son while standing next to a panting air compressor and a blowing safety valve, telling him what he was missing out on?



The best meeting place at any club, the turntable, lots of steamy conversation!

Photo: Clive Huggan

Pinnacle Village Railway

A 5" gauge railway in Far North Queensland

Story and photos by Roger Anderson

Roger Anderson has built up his very scenic 5" gauge railway around his Pinnacle Village Holiday Park at Wonga Beach. With the 1995 Easter convention being held at Townsville, it's an appropriate time to introduce Roger's railway.

The track at Pinnacle Village Holiday Park is approximately 20 minutes drive north of Mossman. The railway is an added attraction to the caravan park, restaurant and gift shop operated by Roger and Sandra Anderson. The restaurant and gift shop are in fact four ex-Queensland Railways carriages, gracefully restored for their new life.

The railway

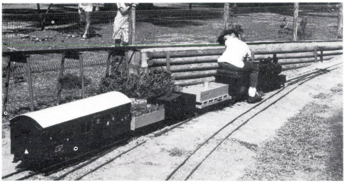
The ground-level 5" gauge railway is basically a large oval of some 750 metres at one end. The main activities area — immediately outside the open end platform of the restaurant — comprises the station, loop, storage and loco service areas and workshop. After leaving the station the railway crosses a gully bridge, meanders through a rain forest area, then through an open garden and through another area of rainforest before crossing another bridge and returning to the station. The railway has some tight pinches in gradients to test the driver's skills.

Motive power

The main loco is a 2-8-4T *Dolphur*, modelled on a large 2'6" gauge locomotive from India. (Featured in *Model Engineer UK* some years ago... ed). This heavy loco is well suited to the high workload requirements of passenger hauling.

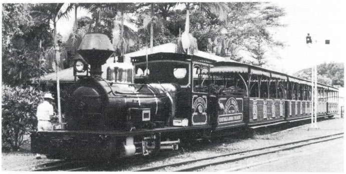
Another locomotive in the stable is a NSW 85 class Co-Co electric. It is powered by four car batteries, using two rewound car generators — one for each bogie — as the motors. The electrics are interesting in their simplicity. Only two control switches operate all functions. One switch selects 24 or 48 volts supply to the motors. The other selects four speed ranges in either direction. This gives a total of eight speeds in either direction. A set of fully charged batteries gives many hours of trouble-free operation.

Neil McKenzie preparing his QR A12 loco for a run.



David Wilds shunting Merv Brookfield's PB15 and scale rolling stock.

Don Reid with his NSW SRA 85 class electric loco.



Mossman Mill's Bally-Hooley, an 0-6-0 made by Hudswell-Clarke, 1950

Running days and local attractions

Visitors with their 5" gauge locomotives are welcome to come and have a run on the railway. But please give some notice beforehand and if you wish to run a steamer, don't forget your current boiler certificate. Every Queen's Birthday holiday, usually the first or second weekend in June, the railway hosts an open weekend and visitors normally come from as far south as Brisbane. Last year, eight visiting locomotives were run, with visitors coming from as far as Adelaide.

The railway is normally run every Sunday from 11am to 3.30pm, wet season weather permitting. Other attractions in the area include the nearby Mossman Sugar Mill tourist steam trains, Daintree and Mossman Gorge, to name but a few.

The contact is: Roger Anderson, Pinnacle Village Holiday Park, WONGA BEACH, QLD 4873. Telephone (070) 98-7566.

Accommodation bookings in the area for Easter 1995 are very heavy, please book early to avoid disappointment!

Acknowledgment

Thanks to QSMEE Newsletter *Oilcan* and Steve Malone for some of the information used in this article.

7306

Story and photos by John Wood

The 73 class was chosen because of its appealing appearance, medium size, and the fact that I had not seen a 5" gauge model of this class. The strongest influencing factor, though, was that my good mate Ted Gray had plans of the prototype (general arrangement and bogies) which had been kindly supplied by Walkers Ltd. Queensland, some years earlier. Ted had chosen to build a 70 class loco, so the plans had not been used at that stage.

Drive system

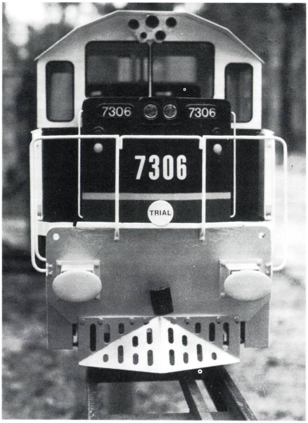
So with much urging to put these plans to use, I made my first venture into 5" gauge. Difficulties soon arose. The main (and continuing) problem was designing it in model form from a prototype plan. However, other problems soon became apparent, such as the transmission. The drive is from a centrally placed electric motor (in the fuel tank) by chain to a lay shaft above the motor. This shaft drives V-pulleys which transmit power to a tower arrangement above each bogie, from where a chain transfers the drive to sprockets on each axle.

Powering to a tower above each bogie (or simply tensioning the V-belt) soon showed that this would tend to raise the outer wheels and promote derailments. This was solved by fitting a ball bearing horizontally on top of the tower to bear against a plate fixed to the frame, thus allowing the bogie freedom to swivel but preventing any lift.

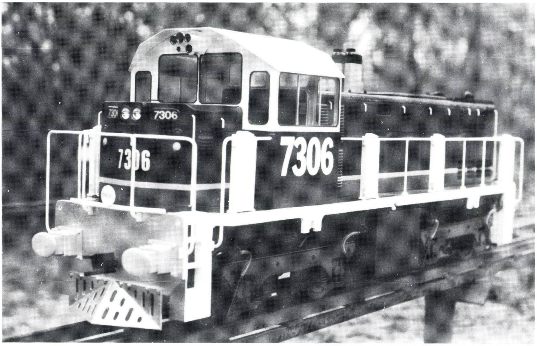
Problems with electrics

Such was the pattern continually throughout construction—figuring out ways to overcome the endless problems. A typical example is something as seemingly simple as lights. Illuminated numbers, red and white markers and headlights are fitted to the leading end only (dummies are on the trailing end). These are all worked from a separate 12 volt small "gell cell" type battery situated within the cab. The numbers and white markers are 12 volt and powered directly; however, the red markers are LEDs and the headlights are the front portions of pencil-type torches, each requiring a resistor to reduce the voltage accordingly.

Although only the first few prototype locos were fitted with angled pilots, I chose the angled variety as I feel they enhance the appearance, and in 5" gauge one doesn't expect too many complaints from the shunters.



Why 7306? It does have significance. I completed the model at age 60 (only just—about a week to spare) but desiring to follow prototype, I could not use 7360 as there were only 50 in service—hence 7306.



The colour

The candy colour scheme—dare I raise the subject? I was sold on the colour by an SRA photograph of freshly painted 7315, although I must admit to being tempted to use the green and yellow paint scheme as applied to 7344. However, I stuck to my first choice and when nearing completion, I became anxious to be the first "candy" loco at Galston. Some will retort "probably be the last!" I was surprised that the most enthusiastic welcome I received on 7306's first running day in January 1993 was from a self professed "candy-colour-hater", who shall remain nameless!

Construction time on 7306 was approximately three years, but in retrospect, it seems that about half the time was spent in trying to work out *how* to do it!

Maritime Matters

with Leigh Adams

ACT Model Boat Regatta

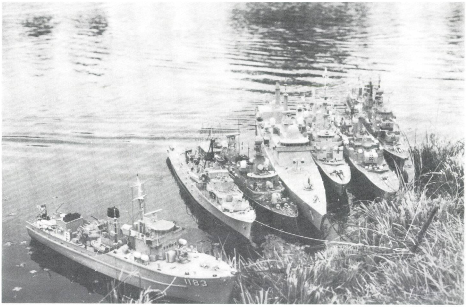
This is the third time this year I've packed the models for a trip away. As we left Sydney in the early hours of the morning, for the ACT model boat regatta on 12-13 November, the clouds threatened to open and dampen the drive south. As the day progressed, the sun burnt off the cloud to unveil pleasant conditions which were to continue for the rest of the weekend. Each year as we travel to Canberra, the trip seems to be shorter as the roads are continually improved. This year was no exception as we covered the 350km in 4 hours.

After confirming our accommodation, it was off to Edison Park. This is another great model boat venue. The local council has created a terrific setting with trees, rolling lawns, good access, parking and an amenities block.

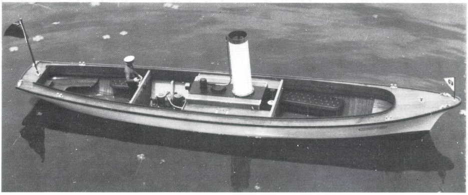
Saturday was set down as the night run, but with daylight saving we were all able to have a couple of runs in the brilliant sunshine, which really had some bite. So as we all waited for the sunset under the shade of the trees, we caught up with members of the other model clubs, some of whom we hadn't seen for twelve months.

The ACT Model Boat Club had organised tea, coffee and some homemade biscuits which really hit the spot. Darkness dropped the temperature to a very comfortable level and the models took to the water. Travelling around the lake you would think Christmas had come early!

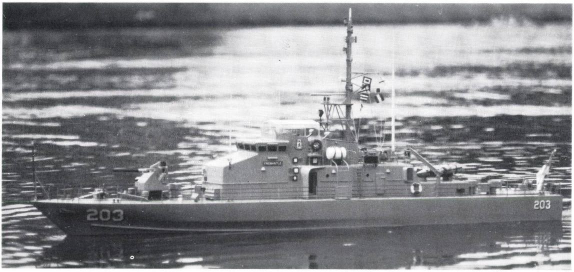
Next morning, in brilliant sunshine, we headed off from the motel, hoping the rain would hold off. Model boaters queued to unload the vans, cars and trailers which unveiled an array of naval, commercial and vintage vessels. By lunchtime a quick count added up to 65 models!



The fleet's in—a flotilla of naval ships tied up at lake's edge.



*Shaughn Lowry's open steam launch **Summer Lady**—twin oscillator and metho fired boiler*



*Jack Reaney's 1/24 scale model of a **Fremantle** class patrol boat.*

Variety was the order of the day, with hardly any two models the same; this was a great display of fine workmanship and detailing.

The ACT club had put together another well organized weekend and all credit should go to them. The decision to move the regatta from October to November paid off, as rain which previously hampered this regatta was avoided.

Well done to the ACT Model Boat Club; thanks for a great weekend!

And now to tools...

A third hand!

There's nothing wrong with having a vice. No, I don't mean grog, smokes or wild women, but modelmaking without a sturdy bench vice is like trying to work with your hands tied behind your back.

For what can be a small financial outlay, this piece of workshop equipment will save you time, fingers and bandaids, but most of all will help you build and create better models.

Various sizes, styles and quality of vices are available on the market, but as the saying goes, you get what you pay for.

Some of the cheaper models have crudely engineered finishes which lead to problems such as uneven closing action, excessive wear and in some cases, breakage.

The two brands I have found to be of good quality and finish are Record and Dawn.

Used over many years, I have not yet had any problems with either of these brands. The main consideration after price when purchasing is *what size*? Commonly available from 3" to 6". I have found the 3" satisfactory for most model boat work. The physical size allows you to get close to small components, but large enough to hold most things associated with modelling and jobs around the home.

As they say, please consider: it's like having a mate to help you in the workshop and it doesn't drink your beer, whinge or go home when you need him most.

1/24 scale tugs from the Newcastle model boat club

***Walumba**, a fine model tug, cruising the lake rescuing stranded models*

A spectacular display of "firepower" as the German fire tender shows off its canons.

Maritime Club News

Melbourne Vic

The Surrey Park Model Boat Club Inc. conducted a "Live Steam and Simulated Steam Day" which was well attended. At the event, which took place around August '94, the models graced the lake in pleasant weather conditions. Jim Fellows won the *Best Live Steam* prize, with Bob McEvoy taking the prize for the *Best Simulated Steam* model.

The Paddle Boat and Titan Tug race day dawned overcast with a strong northerly wind and showers developing during the morning. However, a number of hardy skippers turned up and made the best of it!

The club helped celebrate the Salute to the City of Box Hill on the evening of 19 November '94. Following the Barbi, members tried their hand at night sailing on the lake. A fireworks display capped off a great evening at 9.30pm.

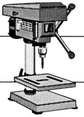
Members joined in the Caulfield Festival Community day on 4 December '94. Several members sailed their models on the Caulfield Park lake, boosting the club's community awareness in the process.

Surrey Park Model Boat Club Inc.
Enquiries to the Hon. Secretary: PO Box 36, Eastern Mail Centre, VICTORIA, 3110.

Auckland NZ

The Scale Marine Modellers are experiencing difficulties with water restrictions preventing the pond from being "topped up." Some members are bored with sailing aimlessly around the pond. There is a suggestion that they add operating features to their models, like the tug with a working winch. Another suggestion was to fit the pond with a small island and lighthouse, as well as small scale docks or wharves to allow interesting operations.

Scale Marine Modellers Inc.
Location: Peterson Rd Reserve, Panmure, AUCKLAND.



Workshop and Technical

Making Boiler Wrappers

by John Riters

Drawing for publication by John Riters

For the novice hobbyist faced with building a locomotive boiler, the task can appear quite daunting at first — particularly when working with 3mm (⅛") copper plate. At present I'm half way through building the boiler for my 5" gauge NSWGR 38 class loco, 3802. I had fabricated the barrel (it is an odd size, 7" diameter) and had the seam TIG welded.

Flangeing plates

I had the flangeing plates for the throat plate, tube plates, etc. laser-cut from ⅝" thick MS plate. The ease of forming the copper plates justified the cost of laser cutting. Mind you, it took a lot of muscle! I believe that substantial flangeing plates are incompatible with an unsound bench and in particular a small vice. That is why I invested in a 6in offset, fabricated, all-welded vice. This alone will cost about $500, believe it or not. This is essential because of the heavy and repetitious hammering required.

Geometry of the wrappers

So far everything has gone quite smoothly. My task was to form the inner and outer wrappers for the fire-box. The more I studied the drawings the more I was convinced it was not as simple as it looked, geometrically that is. I knew it was not just a matter of clamping one bottom edge of the wrapper and simply bending it to shape. The problem was that the bends were really helical bends, because all the flanged plates were not the same size in profile. I also realised an expensive amount of copper sheet could be wasted if I wasn't careful.

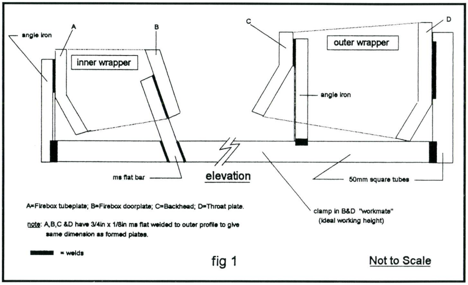

angle iron
A
B
inner wrapper
C
D
outer wrapper
angle iron
ms flat bar
elevation
50mm square tubes
clamp in B&D "workmate"
(ideal working height)
A=Firebox tubeplate; B=Firebox doorplate; C=Backhead; D=Throat plate.
note: A,B,C &D have 3/4in x 1/8in ms flat welded to outer profile to give same dimension as formed plates.
▬ = welds
Not to Scale

fig 1

Solution

The solution lay in making forming jigs (refer to Figure 1) and using cardboard templates. Simply wrap a large piece of cardboard around each jig and mark with a pencil. This was cut with scissors and transferred to thin-gauge aluminium sheet. The aluminium template was scribed on to the copper sheet, which was cut using a jig saw with 18 tooth blades. When marking out the aluminium template, don't forget to scribe the longitudinal centre-line and transfer it to the copper sheet as well. It makes it easier when clamping the copper sheet central to the forming jigs. The formers, by the way, were my original flangeing plates.

Modifying flangeing plates

When forming the flanged copper plates, all the formers were originally flat. However, at the "bend lines" in Plates A and C (Figure 1) I milled a ½" wide slot to ½" depth. They were then easily bent cold to the required angles in the vice prior to mounting on the jig.

Procedure

Position the copper sheet on top of the jig with the longitudinal centre-line lined up with the former centre-lines. Clamp in position and anneal. I found it very easy and convenient to anneal the copper sheet while it was mounted on the jig. Simply heat to the required temperature then have an offsider pour a bucket, a *big* bucket, of cold water over it for quenching. After quenching, just simply squeeze the wrapper around the jig by hand. Another annealing may be necessary. Finish off by using a piece of softwood and a mallet to form the final profile.

You'll find by using the above procedure that the fit-up prior to silver soldering is very close. And, more importantly, the wrappers are kink-free!

Safety In The Workshop

by Murray Mitchell

A few handy hints to help make model making safer

The lathe

Always remember to take the chuck key out of the chuck when not in use. The chuck can be a hazard with the jaws protruding, especially when filing in the lathe—always use a file handle. It has happened, that when using a file without a handle, the front of the file has hit the chuck jaws and the file tang has become embedded in the palm of the hand—quite nasty.

Be careful with long sleeves: always have them buttoned up. When using emery paper or tape, do not wrap the tape around the work and then squeeze it, as it will grip itself around the work and rip it through your hand. I had a personal experience of this resulting in a couple of stitches in my left hand.

When fitting one piece to another, always stop the lathe to try for a fit. Put a piece of rag over the tool, especially a boring tool. This will help to avoid a situation where the part becomes jammed, then suddenly breaks free and the tool buries itself in your hand.

Do not put your finger in a hole you are boring while the lathe is running, especially screw threads. A fellow I once knew put his finger in a hole he was screw cutting, to clean it out while it was revolving: consequently his finger wound into the hole. It was very painful trying to get his finger out.

Eye protection

If you have to clean out a hole, especially a blind bored hole, use a piece of rubber or plastic hose, and blow it out. Wear safety glasses of course. If you do not wear prescription spectacles, always use safety glasses, especially when parting off steel. Brass, when parting off or turning can be dangerous as far as the eyes are concerned. In fact you should wear eye protection when there is any danger of flying particles. These include lathework, drilling and grinding.

Swarf hazards

There is also a hazard with shavings, especially steel. Long shavings get caught around the work and even around the chuck. Stop the lathe and remove shavings with a pair of pliers—never with the fingers— as their edges are razor sharp.

A friend of mine was working in his workshop, and was called to lunch. He had been turning a piece of steel, which produced some long shavings, and they were all over the floor. He turned to go out of his workshop and stepped on one of these shavings, and when he turned to walk out the other foot also tangled in the same shaving. When he walked the shaving cut through his sock and Achilles tendon. He now has a limp with one leg shorter than the other.

Lesson learned here: keep the floor clean at all times. [And wear boots in the workshop — ed].

If you are cleaning the lathe, always remember to remove all the tools, drills etc. When changing belts, especially vee belts, always stop the machine.

When drilling holes, do not use your fingers to remove the shavings: stop the drill and use a pair of pliers. Do not use your fingers to hold small work, always hold it in a vice or a clamp. If you are drilling thin sheet metal use a clamp or a pair of pliers, or clamp it to a piece of wood.

Guillotined pieces of steel have very sharp edges.

Grinding wheels

Grinding can also be dangerous to our eyes. Always wear those safety glasses, even if you wear prescription spectacles. The pieces coming off the grinding wheel are red hot, and can burn on to the glass or plastic lenses, ruining a pair of expensive spectacles. Make sure the work-rest is close to the wheel, as any gap can be dangerous.

Always when you put on a new wheel, start it up and stand to one side, letting it run for a few minutes. If it is cracked it could explode. I can name a couple of incidents that have occurred in my engineering days.

Conclusion

In closing, keep your workshop clean and tidy, paying particular attention to the floor. A workshop with a clean floor is a much safer place to work in. Although I have not mentioned other equipment such as milling machines, and welding or brazing gear, they must be used with care and common sense.

I hope these notes will help us all to be more careful and to make model engineering a safe and enjoyable hobby.

**SECURE YOUR WORKSHOP
OVER THE HOLIDAY SEASON!**

Neil's Workshop

by Dave Harper

I'm very fortunate to have Neil Mackenzie living just a few streets away. Neil's workshop is always a hive of activity, and browsing around among all the stuff that any good workshop has, I'm always coming across something interesting.

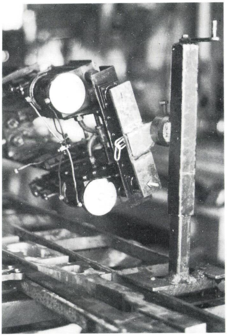
It occurred to us that some of these things would be of interest to AME's readers: so here goes with a pot pourri of bits gleaned from Neil's workshop.

A couple of items that are always in use are the loco turntable and roll-over stand. The turntable, which is bolted to the bench, has a simple tube-in-tube pivot that allows the loco to be turned around for easy access.

The roll-over stand—my name for it, I don't think Neil has one—consists of two units that clamp on to the bench track and attach to the loco by screwing on to the buffer beam in place of the buffers. Once this is done the handles on top turn a 3/8" threaded rod which jacks the whole thing up off the rails. Then the whole loco can be pivoted on its longitudinal axis and locked in any desired position. This makes working on a loco a breeze, and I should think would be essential items in any model loco workshop.

Sometimes, Neil tells me, he mounts the roll-over stand on the turntable to give a totally flexible mount. He also stresses that turning over a large, heavy loco needs considerable care!

Finally—for this time—I picked up a couple of odd-looking tools and asked what they were.



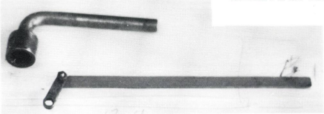
The roll-over stand consists of two units that clamp on to the bench track and attach to the loco by screwing on to the buffer beam in place of the buffers.

"Special spanners" was the reply, "to get into awkward spots".

The socket spanner was made from a cap screw and a bit of mild steel rod for undoing 3/8" AF hex nuts on clack valves.

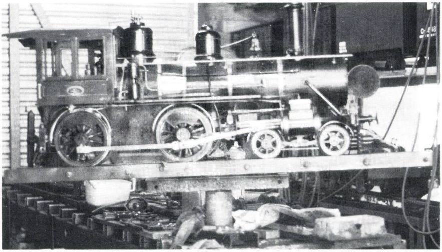
The little ring spanner was also made from a cap screw silver soldered to a short arm which pivots on the long handle. It was made for undoing 8BA hex screws in a tight spot on one loco, and has come in handy for many others since!

That's all for this time, but if you're interested I'll see what other gems I can glean from Neil's workshop. Let us know!



Left: *Special spanners—to get into awkward spots.*

Below: *the loco turntable*



Double Acting Boiler Feed Pump

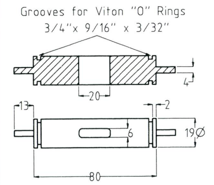
by Les Payne

Drawings for publication by Peter Manning

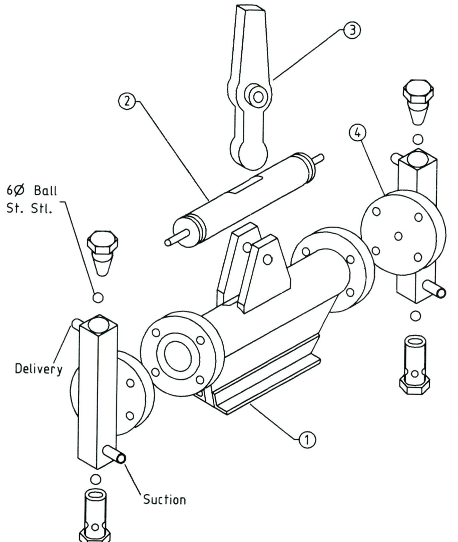
"Necessity is the mother of invention": that is the motivation behind the development of a double acting boiler feed pump for *James,* a 7¼" gauge 0-4-0 Heidi Locomotive.

Recently *James* suffered a leak in the firebox of the Briggs boiler which necessitated the fitting of a new furnace coil and the retesting of the boiler to obtain a boiler certificate for a further two years. The boiler received a hydrostatic test, then a steam test, followed by a steam accumulation test. The boiler was required to be steamed at full fire and the water level drop from the top nut to the bottom nut of the gauge glasses was noted.

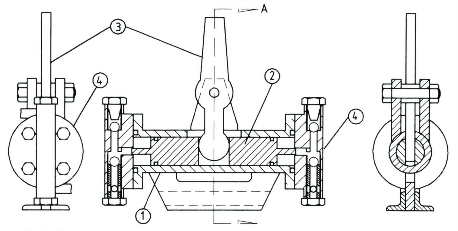
James was only fitted with steam injectors, and at full pressure plus 10% a critical few minutes elapsed before the fire rate was reduced and the water levels restored to the gauge glasses and the boiler settled to full working conditions. I felt that it was necessary to have an alternative method of introducing water into the boiler.



② Piston St. Stl. - 1 off



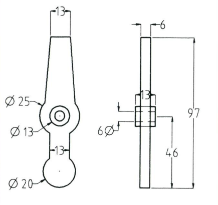
EXPLODED VIEW OF PUMP



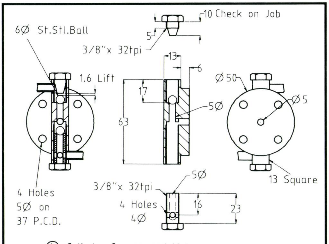
End View

Section AA

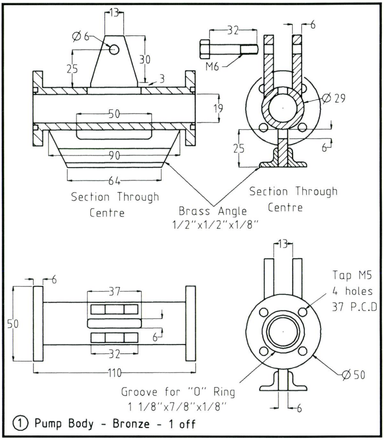
Sectional Arrangement of Pump



③ Pump Handle - MS - 1 off



④ Cylinder Covers and Valves
Bronze - 2 off (one each hand)



① Pump Body - Bronze - 1 off

I looked around but could only come up with a plan of a single-acting pump, which unfortunately produce uneven water flow while pumping. However, with the help of Martin Evans' plans, I duplicated the sketches and came up with a double-acting pump.

Starting with a bronze cylinder of 29mm diameter and 110mm long, two flanges were screwed on the ends and silver soldered with brass angles etc. to form the base of the pump as per the drawings. Next the 6mm wide slot was milled in the top of the cylinder to a length of 37mm and the brackets for the handle fulcrum were brazed into position. The pump body was then set up in the lathe and bored out to 19mm diameter with "O" ring grooves machined in the end flanges for the pump head seals. At this stage also, spigots were machined on the cylinder flanges for lagging cladding. The stainless steel piston was made, the 6 x 20 slot milled through the piston and the grooves machined to "O" ring standards for the piston "O" ring seals. The tapered handle was then made with a 20mm diameter head to fit the piston crosshead and a 6mm diameter pivot bolt through the handle. Two cylinder heads were then prepared (50mm dia by 6mm thick) for the pump body and the13mm square by 63mm long valve chambers were drilled and tapped ⅜" x 32TPI and fitted with screwed plugs and ¼" stainless balls to allow for 1.6mm lift. Four 5mm dia holes were drilled at 37mm PCD in the heads along with tapped holes in the flanges of the pump body. The pump was then completely assembled, the cylinder was lagged with ceramic wool insulation, and 0.010" shim brass was soft soldered to the spigots machined on the body flanges. An extension handle 150mm long was made to fit the taper of the short lever. On the first test of the pump it reached a pressure of 200psi and delivered a continuous flow of water, which makes it a highly effective unit for *James*.

Making a Steam Turbo Generator

by John Riters

The idea for the design of this generator is not mine: I saw it fitted to an engine belonging to one of the Lake Hume club members on an inter-club running day.

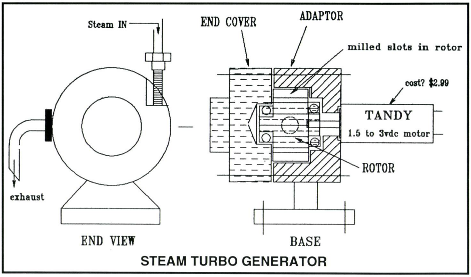
The generator cost the owner $3 for the electric motor and about $24 for the bearings, plus bits and pieces from his scrap box.

The sketch is only a broad outline of the assembly: final dimensions will be governed by the bearing sizes. The turbine "blades" are a series of radial slots machined with a small end mill. The exhaust port is located opposite the steam inlet. It looks simple and should not be too hard to make.

Tandy Electronics have similar motors with a 12vdc output. They are more expensive — at around $6 ea.

The bearings are available from the Consolidated Bearing Company (CBC). The part number is WA673ZZA, size 3mm ID, 6mm OD, 2.5mm wide. They cost around $12 each plus tax.

You will notice that one bearing appears slightly larger than the other on the drawing. This was accidental due to "zooming" problems on my CAD programme. They are in fact, meant to be identical.



STEAM TURBO GENERATOR

Motor specifications:

- Current: 0.98A at maximum speed & load.
- Speed (no load) 5700 - 11600 rpm.
- Speed (load) 4100 - 8300 rpm.
- Motor shaft diameter: 0.0785".
- Motor shaft is a push fit into the rotor.

Simple Sharpening Jig for Small Drills

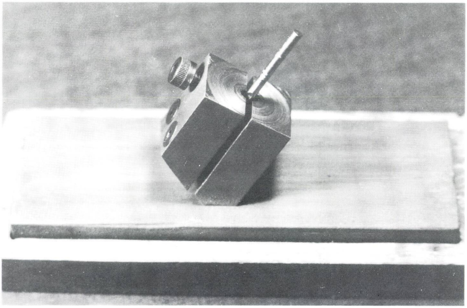
Story and photos by Drew Diamond

Drawing for publication by Peter Manning

With practice, drills larger that about 3mm may be sharpened free-hand on the grinding wheel or oil-stone and checked against a drill point angle gauge. However, sharpening those smaller than 3mm can be rather fiddly without the aid of a dedicated fixture. Here is a handy little jig for drills from about 1mm to 4mm. No claims for originality or superiority are made, but of all the designs I have so far observed, it is arguably one of the simplest for the amateur with limited tooling to make and use.

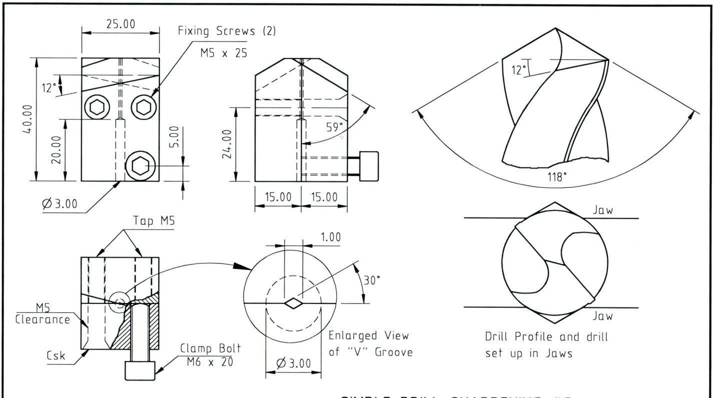
Two identical bright mild steel (BMS) jaws have the required 59 degree point and 12 degree clearance angles machined or filed upon them. The drill is fixed between these with the point projecting just beyond the jaws. A few strokes along a fine grit oil-stone for each face will restore sharpness to the cutting edges.

As with most simple devices, there are compromises: after sharpening, the two flanks of the drill point are "faceted" (like a diamond) rather than curved. In practice, for small drills, this does not appear to materially affect the cutting performance or life of the drill. Secondly, some practice is required in setting the drill in the jig to obtain most satisfactorily precise cutting angles, but this skill is soon acquired.

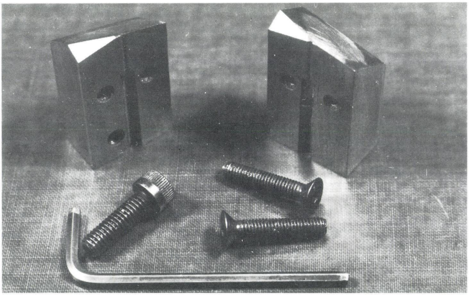


The completed drill sharpening jig, ready for action!

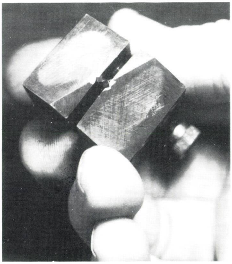
Two lengths of 15 x 25 mm BMS each about 40 or 45mm is suggested for the jaws. None of the dimensions are critical, although the angles are important. With the aid of a protractor or drill angle gauge, mark the 59 and 12 degree angles as shown. Cut off the waste with a hack-saw leaving about 1mm for removal by file. File to the marked lines and test against your gauge. For the cutting edges of the drill to receive the same treatment, both halves of the jig must be identical. To ensure that they are, position them together in your



SIMPLE DRILL SHARPENING JIG



A few simple components to make this useful sharpening jig.



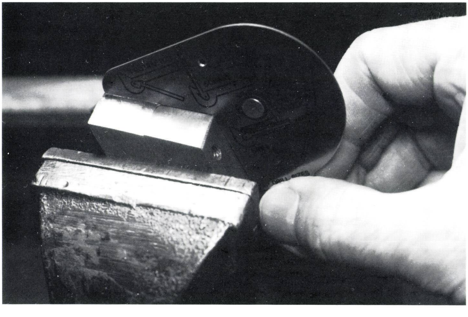
A drill bit held in the jig.

vice with the faces forming a continuous plane, then touch up with a smooth file. Place the two jaws together back to back and see how they look. Don't remove the projections yet — they will be filed off later when the two jaws are screwed together.

Mark out the position of the two fixing screw holes for one jaw, then grip it in a machine vice and drill each of them to clearance size. Place the jaws of the jig together so that the Vee thus formed by the projections is exactly centred, then fix the pair in the machine vice. Using each clearance hole as a guide, drill the tapping size fully down through each hole. Leave the pair undisturbed in the vice. Again using the clearance holes as a guide, perform the tapping operation. Countersink the clearance holes, then screw the two jaws together. With a square needle file, produce a small notch in the exact centre of the Vee (this marks the start of the vee-groove which must run part way down the axis of the assembly). We can now file off the two projections.

If you have a lathe, place the assembly centrally in a four jaw chuck (use the filed notch mark to set up against tail-stock centre — then reverse) and face off the bottom, then drill 3mm to about 20mm depth through the axis at the join. Otherwise, file the bottom flat and square, then centre-punch the exact centre at the join. Place the assembly at 90 degrees in a machine vice or vee-block and drill 3mm to about 20mm depth.

Separate the two halves. You should have a nicely centred half-hole along each axis extending truly about half the length of the jig. With a square needle file, form a shallow well-defined vee-groove to run axially between the mark and the drilled hole (the axial truth of the vee-groove is more important than the drilled clearance hole, so don't worry if the drill has wandered a bit, as may happen in some drill press operations, especially when drilling down a join). Finally, drill and tap for the clamp bolt.



Checking the faces with a drill angle gauge

In use, with just the two fixing screws, it can be awkward in getting a fine adjustment upon the positioning of the drill in the jaws because it may sometimes shift while tightening. This problem is dodged by using a clamp bolt. Just lightly pinch the fixing screws and then get a firm "vice grip" upon the drill by tightening the bolt, which is initially adjusted to separate the jaws to about the drill diameter.

A little practice may be necessary to obtain a "feel" for the device. Start with a dull smallish drill of perhaps 2mm diameter. Set it in the jaws so that, with the gap running left to right, when looking down on the point and the and drill flutes right and left you see an "X" formed by the cutting edges and heels. Place the point guided by one flank of the jig upon the oil stone and draw it firmly downwards a few strokes. Repeat for the other facet. Some small rotational adjustment of the drill position in the jig one way or the other (only a few degrees) may be necessary to obtain correct point and clearance angles.

References

1. *Home and Workshop Guide to Sharpening* - Harry Walton. Barnes and Noble.
2. 'The End of a Boring Problem' - D.A.G.Brown, Model Engineer, 7 Jan. '93.
3. 'Simple Drill Grinding Jigs' - Geoff Oakes, Model Engineer's Workshop, Apr/May '91.
4. *The Bedside Machinist* - written and published by Guy Lautard.

Index to *Blowfly*

L-Z index of the construction articles for Barry Potter's 5" gauge *Blowfly* Locomotive and the full index of Ross Bishop-Wear's Riding Truck as featured in AME

Compiled by Melanie Dennis

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Index—5"g Ground Level Riding Truck

Designed by Ross Bishop-Wear

This useful vehicle is readily adaptable to virtually all gauges and should prove extremely popular for its well thought out design features and construction techniques. The construction series ran over three consecutive issues of AME.

- Part 1 Frames, Body and Water Tank Issue38 Sep/Oct 1991
- Part 2 Bogies Issue 39 Nov/Dec 1991
- Part 3 Brake Gear, Final Assembly Issue 40 Jan/Feb 1992

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A 5" gauge NSWGR 422 class Diesel Outline Locomotive

Part 18 of the construction of a battery electric mainline locomotive

Neil Graham completes the body section and Barry Glover commences cab detailing

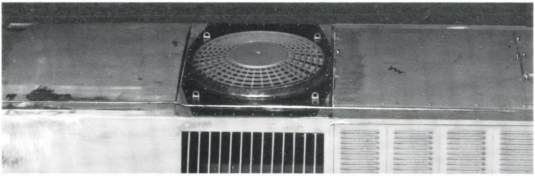
Drawings for publication by Neil Graham and photographs by Barry Glover and Neil Graham

The fan cowlings

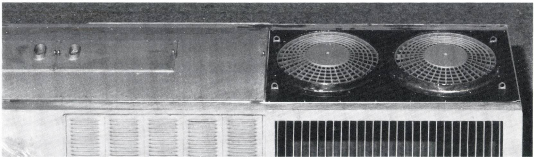
The cowling on the No.1 end roof fan is different to the cowlings on the No.2 end fans. Study **Figures 28a** and **28b.** These show the marked copper sheet and the completed fan cowling for No.1 end. Refer to **Figures 29a** and **29b**, showing the marked copper sheet and the completed fan cowling for No.2 end.

No.1 end cowling

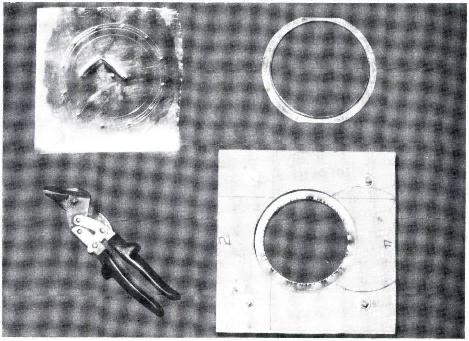
This is marked out on a flat piece of 0.5mm annealed copper sheet. Mark all the circles as shown — the far outer and most inner fairly heavily. The 127mm line we use as a datum when setting the flat piece in the former block. The 134mm diameter line is the Pitch Circle Diameter (PCD) for the fasteners. Refer to **Figure 28b** and lightly centre-pop the positions for the 12 x 1.2mm holes to be drilled in later.



The No.1 end of the centre body section with the single fan unit. Note the signal air line which runs fot the full length of the centre body, along the edge of the roof section.



The No.2 end of the locomotive centre body section with the top cooling fans arrangement complete. The signal air line can be just seen in the foreground.



In this photo, the top left shows the No.1 end cowling marked out and ready to be cut. Top right shows a No.2 end cowling after forming and cutting out to size and shape. Bottom right shows a No.2 end cowling copper in position in the former.

The 112mm diameter section is cut out with a pair of snips. Use a pair of left or right hand curving cutters. This is to ensure that the centre piece cuts off to be the scrap.

The flat copper is now located in between the former blocks, centralised using the 127mm circles as your guide, and the assembly is clamped up with the 4 x 6mm fasteners. Now the idea is to gently beat the copper, slowly and evenly around the inside, so that it is gently starting to form around the 2mm radius of the bottom former block. When you sense that the copper is not "giving" easily, this indicates that it has work hardened. If you pursue with the forming, then the copper will eventually tear and will have to be scrapped. So, before this happens, remove it from the former and anneal it. I used a small LPG torch to anneal the copper: its not-too-fierce heat was enough to do the job. Replace the copper in the former, align it concentrically and clamp it up. Then return to your panel beating. You may have to do two anneals to get the correct shape of the cowling.

After you have attained the correct finished shape for the cowling, drill through the 12

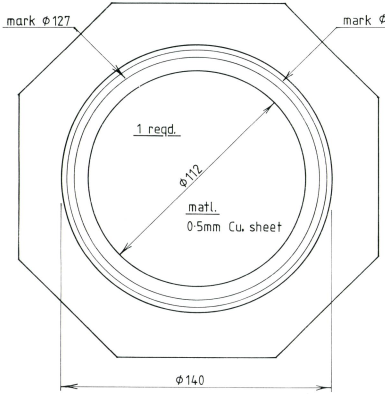


Figure 28a No.1 END FAN COWLING DEV.

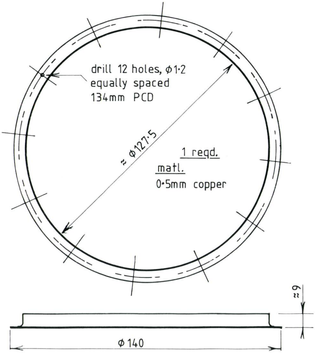


Figure 28b No.1 END FAN COWLING

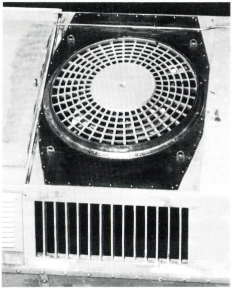
previously centre-popped holes with a 1.2mm drill. Finally cut the cowling outside diameter to 140mm. Clean up the edges with a fine file.

The No.2 end cowlings

The method for forming the two cowlings for No.2 end is the same as for the other end, only the diametric markings are different, as shown in **Figure** 29b. The inside marking is 106mm on this one. The datum mark is at 127mm diameter, the PCD mark is at 140mm and the outside diameter is at 146mm.

Study **Figure** 29b then mark and centre-pop eight equidistant centres on the 140mm diameter mark. Finally mark the two parallel chords as shown in **Figure 29b**. Next, cut the centre out of the copper at 106mm diameter.

Using the former blocks and clamping the copper sheet between them, beat out the shape of the cowling. You may need to do three annealings on this one to get the cowling profile to the desired finished shape, due to the higher lip on the No.2 end fan cowlings.



Looking down on the No.1 end roof fan grill

After completing the forming, drill the eight centre-popped marks through at 1.6mm then cut the outer edge out at 146mm diameter, and finally cut the two chords on opposite sides of the cowling.

Note that two cowlings are needed for the No.2 fan-room end.

Fitting the cowlings

The No.1 end cowling can then be sat in position over the top of the fan grill. It should be just a neat push fit over the plastic moulding. When home, the top of the cowling lip should be flush with the top edge of the plastic grill.

Using the cowling holes as a guide, drill the 1.2mm holes right through the roof and insert the $\frac{3}{64}$" rivets through the holes one at a time, snip them to length and lightly peen the inside. Do this until all the rivets are in position.

You can now take the opportunity to re-fit the 80mm fan in position under the No.1 end fan grill. But, before you do this, check the direction of rotation of the fan by putting the leads across a 12v battery and observe the direction of air flow. Sit the fan in its in-roof position so that the air flow is from the battery compartment to the outside of the loco. Secure the fan in position. The wires from the fan need to be extended to run to the centre of the loco with a bit left over. I used a piece of red and white twin-core control cable. Lay the cable in the V between the mansard and the side and run it along and out through the side cut-out access with a bit to spare. The cable can then be held in position with pieces of sticky tape. Now put a small dob of silicon sealant at 50mm intervals all the way along the wire between the fan and the mid-side panel access. When it has cured, the sticky tape can be removed.

The No.2 end fan cowlings are fitted similarly to the one just done. Make sure the plas-

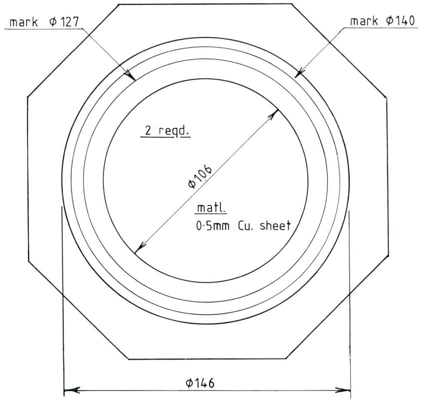
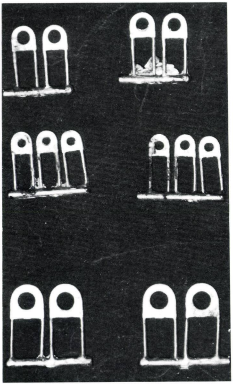


Figure 29a No.2 END FANS COWLINGS DEV.



Part of a set of the lifting lug castings. All three sizes are shown.

tic grills are in position in the roof before you start. Then fit the first one in position, checking the orientation of it against Figure 24 (AME, Nov/Dec 1994, page 45). Drill through the eight 1.6mm holes right through the roof, then fit the eight rivets. Cut them to length on the inside of the roof then lightly peen to secure them. Now do the same to the adjacent fan cowling.

Energising the fans

The full wiring of the auxiliary electrics will be covered by Neville Levin in a future issue. However, to allow you to "get mobile", the following can be done.

Purchase an in-line RCA plug and socket (*Dick Smith* P-1422 & P1412; or *Jaycar* PP-0242 & PS-0252). Solder the plug on to the lead from the No.1 end fan, making sure the red wire goes to the centre pin. Next make up a 2-core lead about 200mm long using an offcut from the fanlead. Solder the in-line socket to the lead, red wire to the centre connector. Now to get your fan on line, the red wire can be soldered to the switched side of the locomotive keyswitch (an automotive in-line fuse of say 500mA should be put in this line) and the negative leg to terminal 11 on the PCS (Power Connection Strip) which straddles the centre section of the locomotive. Allow the socket to hang next to the keyswitch panel on the No.1 end side.

Now put the batteries in the locomotive and wire them in. Turn on the keyswitch and both the main (127mm diameter) fans should start up. Check their direction: the fans should draw from the engine room and blow into the battery compartment. If the airflow is

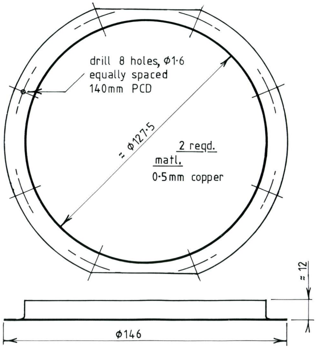
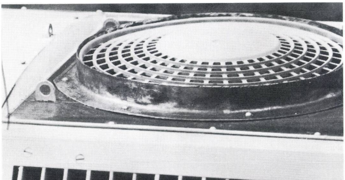


Figure 29b No.2 END FANS COWLINGS



Closeup of one of the No.2 end cooling fans and lugs

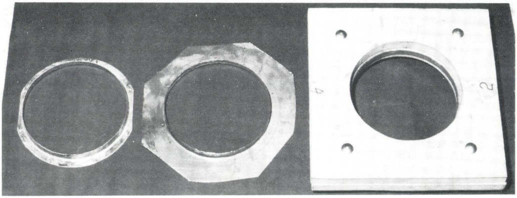
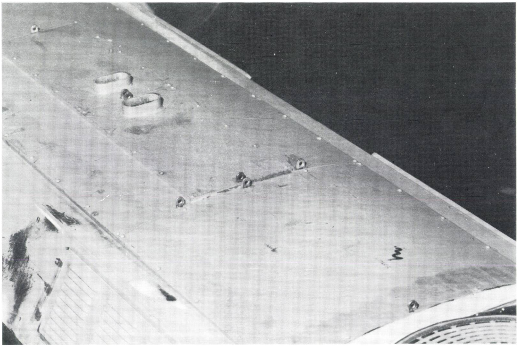


Photo above shows three of the stages of forming the cowlings. Far left shows the near finished product. Middle one has been released from the former. Adjacent shows the cowling still in the former after completing the formation of the lip.



A look along part of the centre section of roof of our model. The small lifting lugs L can be just seen. The location of these lugs differs on some of the locomotives in full size. However, we have gone for a "mean" arrangement which the majority of the locomotives possess.

not correct, do *not* reverse the connections on the motors (as this may destroy them), but simply reverse the directions of the fans on their bulkhead so that the airflow is the correct way.

Turn the power off. Now check that the lifting handles for the batteries are lying flat on the batteries with the plastic handles towards the battery ends. In other words keep the centre area of the batteries clear, especially at No.1 end, as the fan-to-battery clearance is minimal. Now lower the centre body mid-section into position on the locomotive. Connect the RCA plug and socket and turn the key on. All fans should now start up and run. Put your hands over the top of the roof and you should feel air coming out of all three cooling fan grills. They even make a reasonable sound!

The main reasons for these fans is twofold.

- To remove hydrogen gas from the battery compartments. This is generated when the batteries are in use and on charge. This is the sole reason for the 80mm fan in the No.1 end of the locomotive.
- To provide some cooling for the traction motors. This is why there are two large fans drawing air through the engine room and pushing it through the No.2 end battery compartment to atmosphere.

Lifting lugs

The roof of the 422 class locomotive has lifting lugs on top to allow various panels to be removed for access to the engine and fan-

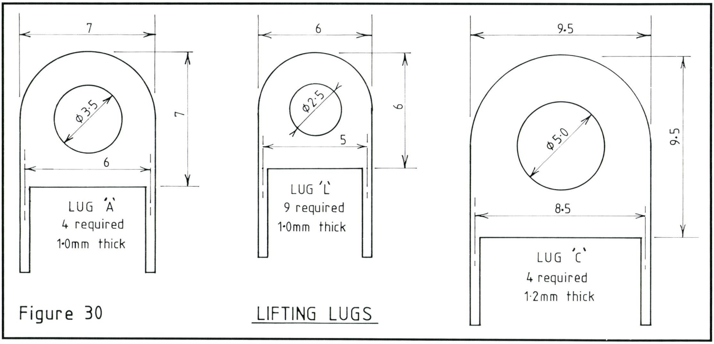


Figure 30

LIFTING LUGS

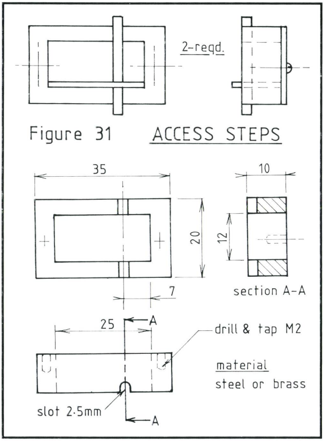
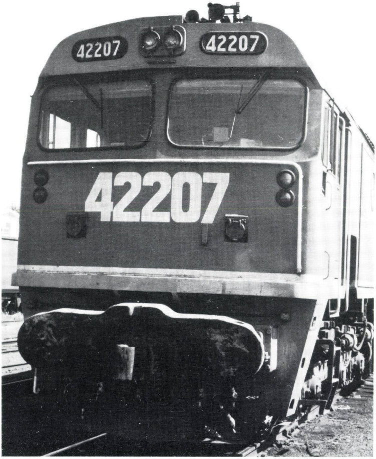


Figure 31 ACCESS STEPS



The "front" of 42207 showing the location of the hand-rails.

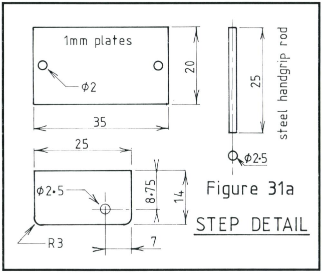
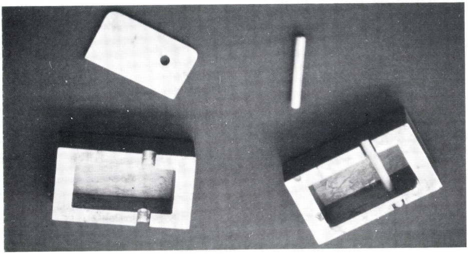


Figure 31a STEP DETAIL

rooms for maintenance. These are rather small and fiddly little blighters, but the roof would look a bit bare if they were left off. They could be made at home from thin brass sheet, but to be honest it would be an absolute pain to get repeatability in size. You could make a master of one, make up a Silastic single-sided mould and cast them in *Devcon A* plastic steel. However, they would be fairly brittle and thus liable to be broken off easily.

However, Scobie & Glover have decided to ease us from the tedium of making them and have had them in brass by the lost wax process. They are now available as a complete set of 17.

There are three sizes of lifting lugs. All the lifting lugs have two pins; thus the orientation is assured. Study **Figure 24** (last issue AME) and also **Figures 24a and 30** in this issue. The four medium sized lugs A are located on the No.1 end fan cover. Chuck the 1.2mm (3⁄64") drill in the high-speed drill and drill through the roof using the fan-room cover holes to spot through. The four lugs C are the largest and are located on the No.2 end fan-room cover. Again, spotting through the previously drilled holes in the



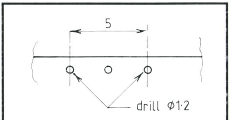


Figure 24a DRILLINGS FOR 'L' LUGS LOCATIONS

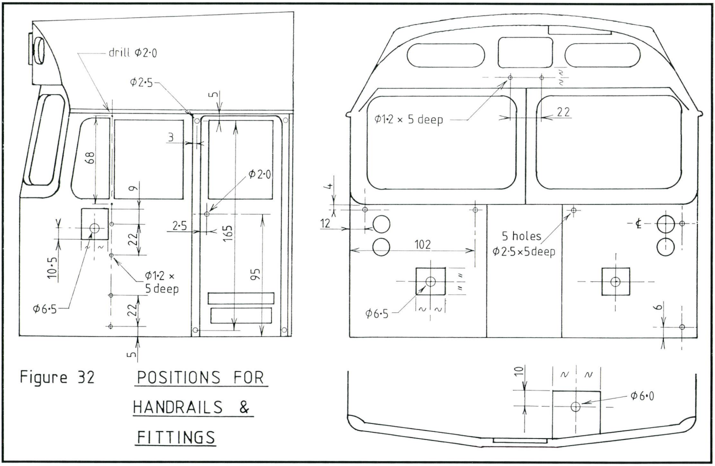


Figure 32 POSITIONS FOR HANDRAILS & FITTINGS

fan-room cover, drill through the roof. The nine lugs L, located in the centre section, are the smallest. You will need to mark the roof sections for the location of these lugs. They will in fact straddle the previously drilled 1.6mm holes. Refer to **Figure 24a** for details. You will see that the pin centres are at 5mm. Cut lifting lugs A and C off the casting sprues, leaving a fair length of leg to protrude through the roof. Fit the lugs by pushing the legs through the drilled holes, bend the leg extensions over on the inside (in opposite directions) and finally put a dab of Loctite on the inside of each.

A general view of the driver's side of 42215

Lifting lugs L are simply located in and pushed into their holes and secured into their respective position on the raised centre roof sections with *loctite.*

Air signal pipe

On the roof of each 422 class locomotive, there is a small diameter pipe running the length of the centre section on one side only and over the cab roof at each end. Refer to **Figure 24** again and see where it lies. We simply laid a piece of 1.6mm diameter soft iron wire (copper would be okay) along it. Where necessary it was bent up to conform to the full-width roofline near No.1 end. Lastly we superglued it in position. We then trimmed it to length 1mm proud of each end of the roof.

Roof access stepholes

This is one piece of detail in the sides which I have completely overlooked. When standing looking at the side of the locomotive with the No.2 end on the left, just near the No.2 cab on the body sides there are two 25 x 12 cut-outs. These are for the footholds to allow the driver or maintenance people on to the roof. We need to fit some inserts into the rear

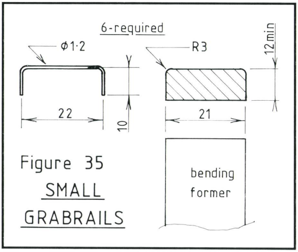


Figure 35 SMALL GRABRAILS

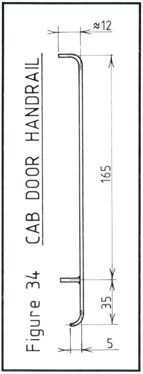


Figure 34 CAB DOOR HANDRAIL

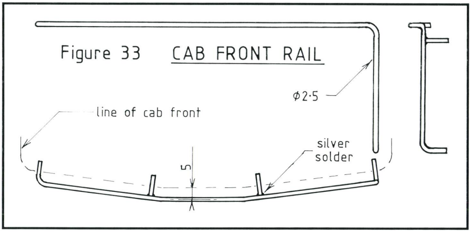
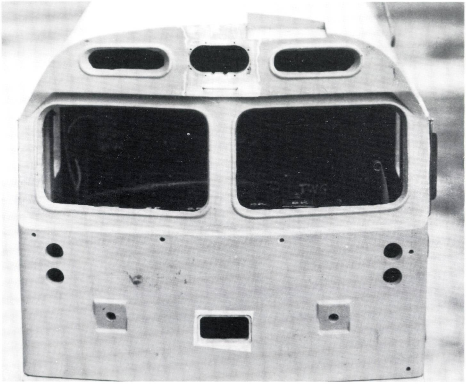


Figure 33 CAB FRONT RAIL


Front of the model cab casting with drillings for hand-rails and fittings. The headlight access and the m-u receptacle hole are also apparent. These items will come later.

of these holes to complete the body.

Referring to **Figure 31** and **31a,** the bulk of the assembly is made up from a piece of rectangular section steel or brass, 35mm long. The majority of the centre is removed to end up with a rectangular cut-out some 25 x 12mm. This can be milled out, then the corners carefully filed square. Alternatively, the centre section can be drilled, cut and filed to finished size. Also a 3mm wide x 2.5mm deep slot needs to be cut in as shown on the block. This can be done with a ball-nosed end mill, or simply cut and filed. Next, a 35 x 20mm piece of flat needs to be cut out of a piece of scrap zincanneal. This can then be drilled in two places with a 1.6mm drill. Offer it up to the rear of the hollow rectangular block, spot through and drill 5mm deep. Tap the block M2, open the hole in the plate to 2mm then screw the plate on. Alternatively, the holes can be left at 1.6mm and the rear plate can be riveted to the rear of the block using a couple of 1⁄16" rivets.

After that, a small 25 x 14mm flat plate needs to be made and drilled as shown. This was made from a 1mm offcut of zincanneal sheet. Finally cut off a piece of 2.5mm diameter rod some 25mm long. Remember to make two of everything.

Offer up the block to the inside of the body side, put the plate in position from the outside (the plate sits on the bottom) then feed the hand-grip rod through. The whole unit should sit flat and square. Now dismantle it and prepare the surfaces with *Loctite 707* primer, then re-assemble in position using *Loctite 324* cement. You will probably need to put the centre body section side down to stop movement of the assembly while the cement cures. Treat both of them the same way.

Grab-rails and hand-rails

The small grab-rails were made from 1.2mm steel wire. The larger section hand-rails were made from 2.5mm welding rod with the flux knocked off. Two of these joined end to end will be needed for the longer hand-rails across the front. Join them by spigoting the end then secure the join by silver soldering together.

Marking out and drilling for the cab front hand-rails

Mark out the position for the grab-iron located just under the headlight. Drill the first hole 1.2mm diameter x 6mm deep to accept the bent wire grab rail. Traverse along 22mm then drill the second hole. Still working on the cab front, mark out the position for the cab front hand-rail and drill holes 2.5mm diameter x 5mm deep as shown in **Figure 32**. Remember to drill the holes square to the face you are working on. Cut six pieces of rod each 10mm long. Place in the three inner holes on one cab. These stubs should protrude 4mm. Give the other cab the same treatment.

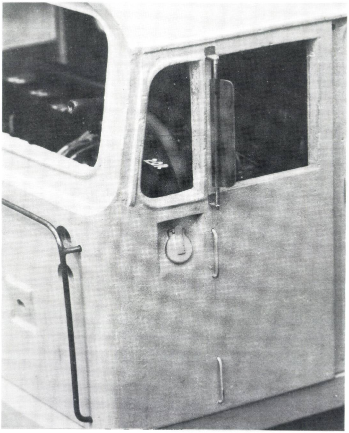
Assembling the front hand-rails

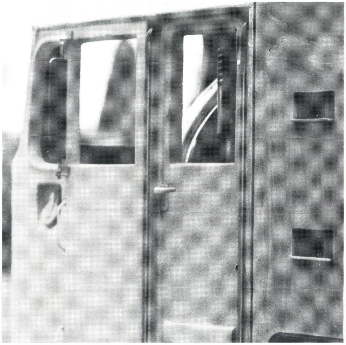
The small grab-iron under the headlight hole is easy. Simply get the soft iron and bend it to the required length and shape. You can use a pair of pliers or make up a little former as in **Figure 35** and bend the wire over it. This will give nice smooth radii on the bends. Test-position for fit, then remove the grab-iron and put aside.

The larger hand-rails are a bit more complex. Cut three pieces of 3mm thick Kao-Wool matting into 25 x 25mm squares and place over the three stubs on the cab. Cut

Materials Required

3 pieces	0.5mm copper sheet, 150 x 150mm
8	1⁄16" brass round head rivets
12	3⁄64" brass round head rivets
1m	light twin core flex
1 only	RCA plug *Dick Smith* Cat. No. P-1422 or *Jaycar* PP-0242
1 only	RCA socket *Dick Smith* Cat. No. P-1412 or *Jaycar* PS-0252
offcut	Heatshrink insulation spaghetti
1 set	17 lifting lug castings from *Scobie & Glover*
4	multiple unit (M-U) socket castings from *Scobie & Glover*
1.3m	1.6mm diameter soft steel or copper wire
12	2.5mm general purpose electric arc welding rods
200mm	1.2mm diameter soft steel wire





Two views of the cab along the driver's side

and bend the hand-rail to shape (following the profile of the cab front) and insert the two ends in their respective holes. You will need suitable pieces of plate to weight and hold the rails in position while silver soldering.

Flux up the areas to be soldered, then get out the oxy-acetylene gear. Fit the very smallest tip to the gun. Then proceed to silver solder the rail to the stubs. After all is well, remove it and put aside. The other cab receives the same treatment.

Cab sides hand-rails

Mark the driver's side only (same side as in **Figure 32)** for the two small hand-rails to be positioned. Drill to depth with the 1.2mm drill. Make up the small hand-rails from 1.2mm soft iron wire. Bend to shape and sit them in their respective holes. Remove and put aside when they are correct.

The door hand-rails (2.5mm diameter) need a similar treatment to the front ones. Mark and drill all the 2.5mm diameter holes to the required depth, i.e. 5mm.

It is worth noting here that we have to depart from the prototype slightly to accommodate the fact that our cabs are removable. The cab door hand-rails are fastened at two places on the cab of our locomotive rather than cab-to-chassis as is on the full size loco. This is done to allow the cabs to slide on and off.

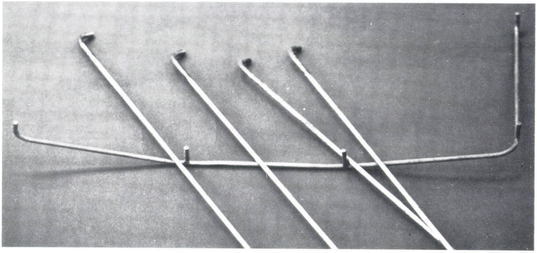
Make up some stub pieces for the holes at the door bottoms. Fit the Kao-Wool matt in position over the stub pieces, then fit the hand-rail in position. Again with the smallest tip in the oxy handpiece and an itty-bitty flame, silver solder the stub to the hand-rail. Now do the same for the other side of the cab. After that, the other cab can be treated the same.

Miscellaneous fittings

In the 422 Part 16 article (Sept/Oct 1994 issue), we fitted the sand-box filler cap casting to the body side of the loco. We previously ordered eight of the sand-box lids. Now is the time to retrieve the remaining four. Clean them up and prepare them to be fitted to the cab. Note the location on the cab sides and drill the 6.5mm holes as required. There are four in total (two on each cab). After this is done, *Loctite* the filler lids in position, noting the correct way up.

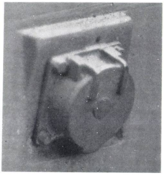
You can check the location for the multiple-unit sockets and drill the 6.5mm holes in the cab fronts for their fitting. Castings for these are available from Scobie & Glover. A total of four are needed (two for each cab front). Clean them up and then *Loctite* them in position.

To be continued ...



Left *shows some of the hand-rails after bending.*

Below *is one of the multiple unit (m-u) castings in position.*



Letter Box

Wagga Wagga SME recovers

Sir,

Another Invitation Run weekend (our sixth) has come and gone, and so have the extremely high winds!

The weather did not prevent the smiles and good fellowship prevailing for the whole period. To the two hundred and fifty or more visitors, may we, on behalf of our society say "Thanks for coming and enjoying yourselves".

We look forward to meeting up with you again at the various functions throughout the coming year, not the least being our 1995 Invitation Run weekend on 4th and 5th November.

Who knows we may have to extend to a whole week in the future!

Jim Leitch, President, WWSME
Cec Appelbee, Secretary, WWSME

A Garratt comment

Sir,

Below are some comments on Garratt locomotives from personal correspondence between myself, Señor L.D. Porta and Dr Giesl Gieslingen, that may be of interest to Garratt constructors.

Señor L.D. Porta:

[Rio Turbio 750mm articulated proposals.]

3 Nov 1979: "A Garratt design has been duly considered at its time and the decision came to the Mallet for not too wide a margin. The Garratt question has been asked by many people connected with British locomotive engineering. I would put the reverse: could you persuade the Americans to build the Big Boy in the form of a Garratt?"

11 Jan 80: "Therefore to get a Garratt alternative to the proposed Mallet is far from being a matter of trial and error. There are some important developments now available to cope with various drawbacks of the Garratt, the most important being perhaps a simple antislipping device, plus practical confirmation of the theory on slipping control."

11 Feb 82: "The traction bar of the Rio Turbio Garratt is to unite both engines, thus replacing the classical frame of the Garratt. Thus, the traction bar serves the sole purpose of transmitting forces, avoiding the need for a special frame."

[Garratts in General] *5 Apr 80*: "Garratts have problems of their own. One of them is that not the whole mass is available to control side yawing movements and oscillations coming from reciprocating masses."

20 May 80: "The Garratt is essentially a tank engine, i.e. one in which supplies are to be carried over the motor...if 1,000 kilometres are to be run, the large variations in the weight on drivers cannot be accepted. If you adopt an adhesion factor corresponding to an empty condition this is expensive both to build and maintain. If a Garratt is to be adopted, only a small supply of coal and water is to be carried on the engine itself, and the rest in a shuttle car."

17 Mar 81: "Obviously the great advantage of a Garratt would be the freedom for a good boiler design. Balancing is somewhat more difficult because a sensible part of the engine mass is subtracted - the boiler."

[ASG and NZR G class] *20 May 80* "None of the difficulties encountered with the concerned engines had to do with the Garratt principle itself."

17 Mar 81: "The literature about Garratts I consider to be most valuable to avoid falling into the same traps which caused much difficulties to the Old Brigade"

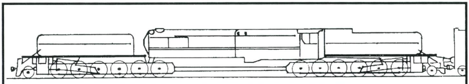
Dr Giesl Gieslingen:

[AD60 Giesl proposal] *12 Dec 84*: "For the 59th class of the EAR I did design a high grade branch pipe for obtaining perfectly uniform flow from the two engines before being ejected into the chimney."

24 Jan 85: "A single GE from Austria would now be very expensive, and manufacture in Australia according to our drawings would be advisable with some parts coming from here to save high pattern and die costs. The parts might cost $4,000 and I might require $1,000 or a little more for drawings."

14 Jun 85: "As we know, boiler size is about equal to the EAR Class 59 and there would be no problem in fitting a Giesl Ejector. Of course, the exhaust pipe and stand pipe would have to be renewed, but a simplified welded construction would be feasible."

Illustrated below is an outline of Señor L.D. Porta's proposed 750mm [gauge] Rio Turbio Railway Garratt from *Continental Railway Journal* (CRJ) No 58 Summer 1984 p262, and *Continental Modeller* July/Aug 1988 p158. The Garratt was a development from a 2-10-10-2 Mallet, CRJ No. 31 p154, and a 2-12-12-0 Mallet-Garratt, CRJ No. 34 p261. Attached to the engine is a fuel tender and a water tender. The traction bar mentioned above is shown.



PROPOSED RIO TURBIO GARRATT

James Tennant
Canberra

Kanangra funnel

Sir,

A reply to Graeme Smith of Canterbury Victoria regarding his comments in relation to the SS *Kanangra* funnel. Yes, you were quite right about the admiralty cowl, although the drawings I worked from did not show it. I have set about making a cowl to put things right. Thanks for your constructive comment!

Ron Adams
Allambie Heights NSW

Nov/Dec editorial comment

Sir,

Having read your Editorial Comment in the Nov/Dec issue a few times I get the feeling that you are casting the bait to see if anyone will take it and respond thus, opening up a channel of discussion on the merits of models propelled by other than steam power. I have gone for it hook, line, and sinker, so for what they are worth here are my thoughts on the subject.

No-one can deny that there is a fairly high investment in time and money or perhaps both in the manufacture or purchase of a steam-powered loco. Even if model engineers are able to do most of the work themselves the equipment (lathe, milling machine etc.) needed is expensive. So, although many (if not most) of those with models of non-steam-powered locos would prefer to have steam power, many of them may not be able to afford their dream machine.

There is also the point that often the necessary commitment of time to produce a steam-powered unit is beyond that which is practical for some people, either due to other commitments, health reasons, or a dozen other excuses. Of course there is also the reason that many enthusiasts simply prefer a diesel or electric loco to a steam one, and have built what they would personally prefer.

As a "petrol-powered peddler" myself, there is one other advantage that I find with the Briggs and Stratton as opposed to the Briggs Boiler, and that is pure convenience. My club's track is over an hour from home and it is handy to be able to run the loco off the trailer and be in operation in just a few minutes. Likewise, when coming home I can help with the "putting away" jobs that are part of any running day and still load and get home at about the same time as those who have to spend an hour on the required tasks to stable a steam loco.

Don't get me wrong, I would love to have a 5" steam-propelled loco, but for a combination of some of the above I have to be content with an internal (infernal?) combustion model of a diesel (diseasal) for the present. Although I have built and operated a couple of Gauge 1 live steamers, plus some stationary and traction engine models on my rather small hobbyists lathe, it certainly is not up to the production of larger units.

While agreeing that there are some rather roughish "quickies" out there, if they give their owner/builders pleasure, and are safe enough in operation I feel they are fulfilling a purpose. There are also a number of I/C powered units which are well detailed models of prototypes which in my experience are admired by many of the steam loco owners who are genuinely in our hobby for enjoyment.

How about calling for photos to be sent in of non-steam locos for a special centre spread in some future issue? Meanwhile, keep up the good work with the magazine. I and hundreds of others eagerly await each issue.

Trevor R. Knight
Warwick QLD

Thanks Trevor for your valuable comments. While I agree with every point you've made, the main point of my comment was something else. It was aimed at the "roughish quickies" as you put it. If you are going to build any kind of non-steam loco, especially for public passenger work, firstly, make it look like a locomotive and not a box-on-wheels. Secondly, we should at least try to aim for a similar degree of finish that the steam loco builders put into their models.

I'll consider a non-steam loco or a marine centre spread photo if there is a good story to go with it! bmc.

Vertical slide

Sir,

I have built the vertical slide, from the Sept-Oct 1994 issue, to suit my lathe. It's okay, but am not happy with the article text. My drawing, as does the original, shows four bolts holding the table, whereas the photo shows six bolts offset. I built mine with four bolts and set it up, but it wouldn't cover the travel across the lathe centre line! So I inverted the table on two bolts and drilled another two, to offset the table to the back of the lathe. Now I realize that is what the author did, but he didn't tell us!

You will appreciate that the tool post centre line is not on the lathe centre line, but forward of it, so the vertical slide should be designed offset. It is evident this was realized on the prototype, but not disclosed. I hope this will save others from being caught!

Peter Kerville
Tinonee NSW

Mystery loco

Sir,

Re Dave Harper's Mystery Loco - Page 19 Nov/Dec AME.

The locomotive in question had a striking resemblance to one of Crampton's Locomotives built by Maffei of Munich for the Palatinate Railway in 1853. (Don't ask me where the Palatinate Railway is). An English gent by the name of Joseph Hall designed the outside valve gear for this loco, but it does have an eccentric driven water pump at the rear of the engine driven from the main drive-wheel axle. Suspension, location of name-plate, chimney, handrails are very close. The Maffei engine, though, is domeless but the rear dome is roughly the same, and Crampton's were outside frames, or sandwich (I'll stand corrected). Crampton's loco, which was named *Die Pfalz* now stands in the Nuremberg Transport Museum. As far as the tender is concerned,it is very much like those fitted to Alexander Allen's 2-2-2 "Crewe Type" locomotives. These also ended up in Europe, so who's to say there wasn't any mix and match going on with locos and tenders in that day?

Hope this is some help, my information was taken from the Book *Encyclopia of Railways* by Hamilton Ellis Print, 1968.

As for Stephenson locos, Stephenson produced a 4-2-0 in 1847 for the Southern Division of the London and North Western Railway. These long-boilered locos were not popular with crews as they were dangerously unsteady as they gained speed. Derailments were common. One of the engines, *White Horse of Kent* (originally a 2-2-2) rolled, killing the crew. It was later converted to 4-2-0 but was still unsuccessful. Another feature of the Stephenson 4-2-0 was the leading wheel being of the solid disc type, the second wheel being flangless; these locomotives also sported six wheel tenders.

Roger Anderson
Pinnacle Village Nth QLD

Letterbox Contributions

Contributions of letters by mail to: PO Box 136 Robertson NSW 2577 or fax to: (02) 646 1362 are very welcome.

As far as possible, AME is an open forum for all members of our hobby. Therefore, all expressions of fact or opinion — as long as they are not libellous — will be considered for publication.

Please **type or clearly print** your letters, as script is often difficult for the typist to interpret.

The Letterbox is becoming a popular medium of expression, so space will be limited. Therefore, letters of 400 words or less will have a better chance of being published.

bmc

Australian Model Engineering

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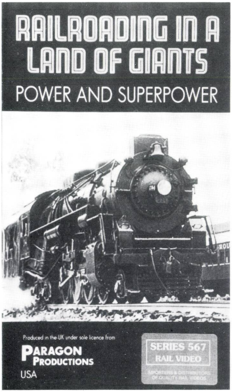
Product Reviews

Railroading in the Land of the Giants II


RAILROADING IN A LAND OF GIANTS
POWER AND SUPERPOWER
Produced in the-UK under sole licence from
PARAGON PRODUCTIONS
USA
SERIES 567
RAIL VIDEO

Subtitled, *Power and Superpower*, the advertisement for this video in the magazines tends to be unclear, because you have the impression that the film was about full-size engines. Nothing is mentioned about miniature railways. The opening scenes of the video—with a black and white slide show—continues the impression with views of American Berkshires, Hudsons, Cab-forwards and an interurban electric in their heyday. Once the video is under way, the impression gradually fades away because the prototype photos are used to introduce each type of superpowered model. The first view of the 7½" gauge locos takes place at the round house—the use of scale structures and low camera angles combine to reveal a most realistic scene! Despite its short scene, the oil-fired cab-forward is very interesting to watch, especially the use of remote cable controls from the tender, (similar to the method Les Shepherd uses to control his 38 class loco). The shot with the Pere Marquette Pacific is rather unusual—the camera is mounted on the back of of the train in front. This scene becomes a bit drawn out, but the engine has a beautiful exhaust beat for a miniature loco. As in the original video, *Railroading in the land of Giants*, the models are up to their usual top standard. Although not strictly superpower, the use of interurbans and gas electric railcars is typical of the transport of the superpower era.

Electric interurban models can be constructed quickly, a possible project for newer and/or younger modellers, until confidence is gained to construct a steam loco.

The scenes showing off the paces of number 315, a 4-6-4 Hudson type, really highlight the elegance of the model engineering undertaken with this loco.

Part of this video features scale trains and timetable working, using rules and regulations of American single track working, that is similar to train order working of Australian National Railways. It is nice to see double heading the way it should be: the timetable working scene is very involved and complicated and shows what can be done. The track is laid out through forest, open plains, over and under bridges. Jeff Hook explains how the timetable operation is carried out.

The 2-8-4 Berkshire type steam loco is a model of one of Lima's superpower engines, it's shown pulling several coal trucks. The weather appears to be damp and cold, just for good steam photography. The PS4 heavy pacific teams up with heavyweight Hudsons on the fast passenger train. The near-scale pullman passenger cars add a nice touch.

Number 213, a Mogul type is shown working the yard clean-up train. This is not a super power engine but it is typical of the era. No 213 is coupled to Ted Young's scale working models of a caterpillar type crawler, cement mixer and very interesting fully operational *Link Belt* steam crane with grab. The train is assigned to picking up coal from stock-piles around the layout. A short scene shows the steam crane in action.

The use of scale rolling stock is becoming more popular even in 7½-¼" gauge. The coal train that the Berkshire is working would weight a far bit. There is no air brake system only a steam brake on engine and tender, maybe.

The use of low camera angles is use to great effect: The closing scene of a free running, driverless steam loco and train adds a nice touch.

This video is viewing, but it is a little less than expected, probably because after the first video in this series, you come to expect a little more of the magnificent machines and their operators than was delivered.

Price: $55.50 plus pack & post

Available from: Series 567 Rail Video
PO Box 12154 A'Beckett St. Melbourne Vic.
Phone: (03) 312 4181, Fax: (03) 311 3480

Mark Carney

Locomotive Management Database

If you're a model engineer with access to a Macintosh computer, this should interest you.

One of our readers has developed a database for planning and recording the design, operation, modification and maintenance of his steam loco. He is offering free copies as a goodwill gesture to other model engineers who might like to adapt it to their needs.

To obtain a copy, send a new 3.5" floppy (two if you don't have HyperCard v2.1) and an SSAE to:

Mac Loco Database, GPO Box 44, Canberra ACT 2601.

Expect a reply in about four weeks.

Unfortunately, the format of this Macintosh database isn't transferable to other computers. Has anyone designed a database for an IBM or other computer system?

Indexing in the Lathe

A little gem, from a restorer of old machinery, as told to James Squirell

For lathes that do not have readily divisible gears in the headstock (most Taiwanese versions). A disk of particle board or custom wood is fixed, to the left hand end of the headstock spindle, by an expanding mandrel.

The disk should be 720mm circumference. A standard seamstress' measuring tape is cut and glued to the outer edge of the disk. This gives 2mm per degree on the circumference ($720 = 2 \times 360^{\circ}$). The idea is that a brake, a bicycle caliper is ideal, is fitted to the disk to maintain registration of the disk while machining operations are carried out. A fixed pointer is arranged to read the graduations off the scale.

If you require greater accuracy than this, you will have to buy a dividing head!

News Desk

Compiled by Brian Carter

Compliments of the Season

To all of our readers: the staff at AME wish you and your families all the best for 1995. We hope that the new year will extend the goodwill and happiness of Christmas.

To continue the theme; Happy Australia day for 25 January. This issue looks at one of the first forms of transport used in this country, HM Bark *Endeavour*, as Ron Lucas' fine model diorama and then the prototype story that also covers the construction of the *Endeavour* replica.

AME Christmas Break

The Head Office (048 85 1179) will close on 23 December and re-open on 9 January 1995. The other numbers will answer, or leave a message, you will not have to wait too long for a reply. The fax number (02) 646 1362 is available 24 hours, seven days a week.

New Zealand distribution

After negotiations with Gordon and Gotch, Auckland, we have decided to expand our New Zealand network. At present, MBM Model Engineering Supplies have been selling AME directly. They will continue to do so, but we will be supplying many bookstores etc. around NZ with copies of AME as well. We expect to begin the distribution with the March-April 1995 issue. We are looking forward to being more available to our New Zealand modelling friends.

The 7+ Narrow Gauger

The Publishers of the 7+ Narrow Gauger magazine have suffered a computer problem which has erased most of their subscribers details. Apparently they have many subcribers in Australia. If you, or someone you know, subscribes to this magazine and has not received the June-August or September-November issues, please write to the publisher to let them know, so they can re-enter your details onto their database.

Traction Engine Rally

We have just received notice that the 7th Australian Miniature Traction Engine Rally will take place at the Pioneer Village, Inverell, NSW on the weekend of 21-22 October 1995. Details are being prepared: for further information, contact Gordon Blake (067) 22 4272 or Bob White (067) 22 1569.

Trade and Commercial

24 Hours of Live Steam

We now have new stocks of our video after we sold out at the Model Engineering Exhibition! The video of the 24hr non-stop steam run, at the Illawarra Live Steam track, has proven to be very popular. It can be yours for only $24.95 posted. Payment by cheque, money order or credit card to AME Retail, PO Box 136 Robertson 2577.

Camden Books

Have announced a reprint of the book *Locomotive Valves and Valve Gears*. You can read Barry Glover's review of the book in AME issue 52, Jan-Feb 1994. See the ad on the inside back cover of this issue for details.

E & J Winter—Bolton Scale Models

If you are encouraged to try outdoor garden railways after reading the story in this issue. Don't forget that Ernie Winter carries the range of O. Burnaby Bolton's, gauges O and 1, live steam loco designs. There may be something there to get you started!

Ernie has indicated that his 5"g NSWGR 32 class loco is as popular as ever. Drawings and castings are still available.

Drafters

Would Greg Hall, who offered assistance with CorelDraw, please contact me as soon as possible.

Articles

All of the material we have on hand is being prepared for publication. There is a good variety of articles in the wings. Some are quite extensive, others are short. To help us plan future theme issues, or if you have something you would like to see published in AME, either contact us, or just send it in, and we will consider it for publication.

A Message from the Australian Miniature Boiler Safety Committee

To all those concerned with miniature boiler design, construction, and inspection.

With the increasing trend towards "user pays" and "competency based" regulations in our community, we felt that it was appropriate to describe the situation as we see it applying to our hobby.

The first, and possibly greatest, impact is that upon insurance matters. Some clubs and societies have already been informed that they may only inspect their members' boilers. From information received, it would appear that this will be an increasing trend. We therefore urge all clubs and societies to closely examine their insurance policies and their coverage. This applies particularly in the areas of cover for boiler explosion, and boiler inspectors' indemnification.

New regulations in course of preparation would appear to leave a gap between the AMBSC maximum sizes and whatever size is deemed to be "full size". The regulations will require a "Design Verification Authority" to inspect the boiler design prior to construction. We are trying to ascertain whether AMBSC codes will cover the gap. One thing we do know is that at least two State authorities will not be carrying out this function any longer, and that most commercial firms which are authorised to verify these designs will not touch what they perceive to be "toys".

The foregoing is a most unsatisfactory situation for the builders of boilers larger than the current AMBSC Codes, and we will be seeking advice from boiler inspectors of registered societies and clubs as to their preference for our direction. In the past, club boiler inspectors have voted for continuing with AMBSC boilers only. To take out "Design Verification Authority" status for boilers larger than our current codes would be horrendously expensive.

Before anyone takes us to task for not foreseeing this when the current codes were produced, please remember two things. The first is that the maximum sizes were set when there were very few, if any, boilers of that size. The second is that the maxima were set by Government authority, not us.

The Code Pt 1 for copper boilers is now issued, and can be obtained from the Honorary Secretary AMBSC. Please do not send money with your order, as we operate an invoice system. For those who already have a copy, we would appreciate your comments. We know that some items "fell off the typewriter", and we would expect to rectify this in the form of an amendment sheet in due course.

Code Pt 2, for steel boilers, has now been issued to selected persons and government departments for comment. We hope to receive all comments by the end of this year, for publication early next year.

We trust that the foregoing gives some insight into the current situation. If anyone knows of any other matters affecting our hobby in this area, please let us know. We will endeavour to investigate everything that is submitted to us, and publish any findings in future.

Yours sincerely.

E. Evans (Chairman), D. H. Merrifield (Hon Sec), R. Forsyth (Technical Representative), B. Day (Asst Sec)

Classifieds

Traditional English Traction Engines

- Drawings, castings, accessories for 3" to 6" scale. Complete boilers supplied with pressure certificate. Machining and gear cutting service available. Send £5.00 sterling (or alternately quote credit card number and date of expiry) for catalogue and price list to: Live Steam Models Unit 7, Old Hall Mills, Little Eaton, Derbyshire. DE21 5DN U.K. Phone: ISD+44 332 830811
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Copper Tube and Sheet Brass

- All standard sections and sheets, available at competitive prices. Send self-stamped addressed envelope for mail order only price list to A-Head of Steam, PO Box 3, Wamberal NSW 2260.
  (See ad on page 4)

5" gauge Britannia Loco For Sale

- Priced at $28000 Contact, Michael Cooke, PO Box 64W
  West Gosford. NSW 2250 Ph: (043) 25 7974.

Rotary Tables For Sale

- 72-1 Ratio horizontal vertical type, includes indexing plates and easy to read instructions. Two sizes available: 6" $342 or 8" $390 Tax Paid. HSS Letter drill set in stand $120. 1-60 number drill set in stand $125, Tax Paid.
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AME Back Issues Nos 2,3,4,5,6,8,9,10,11. Will pay good dollar. Phone 003 951528 After 7pm P.O. Box 154 Lilydale 7268 Tas.

Fixed steady for Colchester Chipmaster Lathe or swap for moving steady (I have two) Phillip Brien Tel. (047) 515061

Any parts for *Qualos* instrument makers Lathe 2½" C.H. e.g. saddle, cross slide and tailstock. Also small vertical open frame launch engine, single or compound. Andrew (03) 481 4691

Ground level riding truck— index

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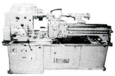

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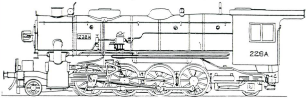

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5" PB15	10	$70	47	$483.00
5" AC16	3	$27	42	$569.00
7¼" BB18¼	16	$126	119	POA

Other Queensland Locomotive Models Under Development

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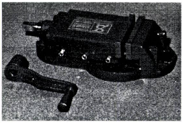

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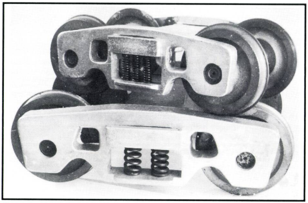

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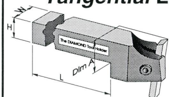

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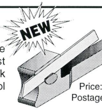

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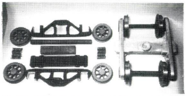

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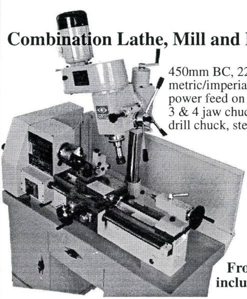

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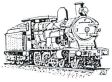
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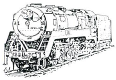
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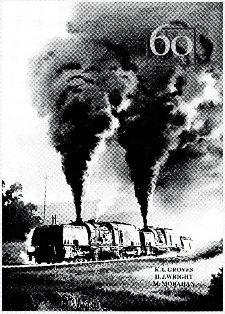

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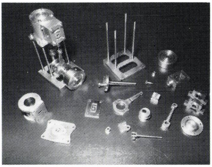

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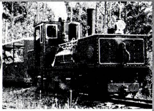

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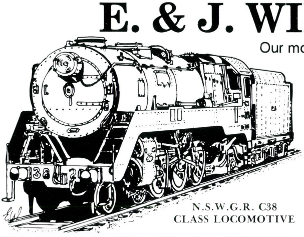

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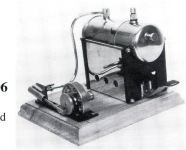

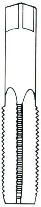

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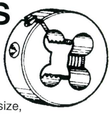

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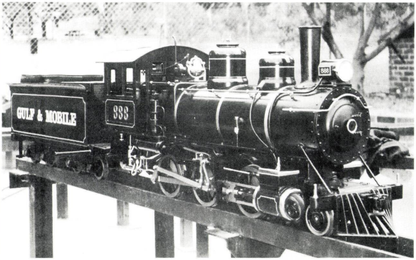

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There are some good books on valve gears available, and we have been pleased to sell them. But we believe this book is the best. Why? Firstly it is more complete. Secondly it is more detailed. Given it has many more pages than other books on the subject, these facts follow naturally, but where this book scores is on its text - it really does put across a complicated subject very clearly, and the quality of the drawings and diagrams is first class. This book was first published in 1917, but we have reprinted the second, and corrected printing dating from 1921, a time when the development of valve gear layout was virtually complete. If the book has a fault, it is that it does not cover rotary valve gears, which appeared after the book, but the two main valve gears - Stephenson & Walschaerts are covered in very considerable detail.

In the preface the authors, Jacob Yoder and George Wharen state, "This book has been prepared to meet a general desire amongst railroad men to acquaint themselves thoroughly with the valves and valve gears applied to the modern locomotive and to master the principles of valve motion as a preparation to valve setting... Valve motion and valve setting have always appeared to many shop men as more or less a mystery. It is the aim of this book to enable all those interested... to acquire a first hand knowledge of it". It succeeds!

- *Chapter 1 (34 pages) you learn about locomotive valves and valve events, and Slide & Piston Valves, including balanced varieties, the universal valve chest etc.*
- *Chapter 2 (60 pages) covers Stephenson Valve Gear. The headings are: Relative Crank-pin and Piston Positions for the Different Valve Events at Full forward Gear. Relative Crank-pin and Piston Positions for the different Valve Events at the Running Cut-off Position. Relation between Motion of Crank-pin and Motion of Piston. errors of the Link Motion. A Study of Valve Gear Parts as they Affect Conditions at the Valve. Effect of Raising and Lowering the Link. The Position of Eccentrics relative to the Crank Pin.*

- *Chapter 3 (75 pages) deals with Walschaert's Valve Gear. The headings are: Introduction. Construction and Development. Description of Parts. Operating Part of the Gear. Relative Crank-pin and Piston Positions for different Valve Events at Full Forward Gear. Relative Crank-pin and Piston Positions for Different Valve Events at Short Cut- off Position. Effect of Raising and Lowering the Link- block. Distortions of the Walschaert Valve Gear. Lay-out of Walschaert Gear. This chapter also covers methods of operating reversing gear.*
- *In Chapter 4, having dealt with the two main valve gears, the authors look at the derivatives, namely the Baker Valve Gear (17 pages) the Southern Valve Gear (4 pages) and the Joy, Young, Gooch and Allen gears (6 pages total). Sections in this chapter obviously have to be read in conjunction with the appropriate earlier chapter.*
- *Chapter 5 (10 pages) looks at the Effects of Altering the Valve and its Events, specifically of altering lap & lead, & of shortening the valve travel.*
- *Chapter 6 (38 pages) deals with Valve Setting. As with the whole book, the concern is full size rather than model practice, but this is a chapter full of great information which can be used on models, especially if you use your ingenuity!*
- *Chapter 7 starts with a 5 page summary and then a 14 page Appendix which covers The Steam Engine Indicator and Indicator Diagram. Application of the Diagram, Horse Power of Locomotives, Tractive Force of the Single Expansion Locomotive, Tractive Force of Two Cylinder Compound Locomotives, Tractive Force of Mallet Articulated Compound Locomotives and Classification of Locomotives.*

This book really is wall to wall information! And Messrs Yoder & Wharen really know their stuff! When they collaborated on this book, they were Supervisor and Instructor respectively of Apprentices at the Altoona works of the Pennsylvania Railroad. The "Pennsy" was almost unique in America in that it designed and built its own engines, so it is no accident that the frontispiece photograph in this book is of the first of its legendary "K4" class Pacifics, one of the most successful 4-6-2 designs of all time; 425 built and in top link service from 1914 to 1957. The authors would have known this design well, & played their part in its construction.

Valve gears work in exactly the same way on locomotives of any nationality, but when this book was first available, British designers, notably Churchward, were being influenced by American practice, We like to think that Mr. Churchward, not to mention Mr. Stanier, Mr. Gresley and Mr. Bulleid, all had copies of this book, but if they didn't - you can!

This is a necessary book for anyone designing or building their own steam locomotives. We can only offer you this book thanks to a customer who lent us his copy. All attempts to buy a copy to reprint in the U.K. and in American come to nought, so this really is rare information!

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